ADDENDUM NO. 001

TO THE

PLANS AND SPECIFICATIONS

FOR

VA LOMA LINDA HEALTHCARE SYSTEM

EXPAND EMERGENCY DEPARTMENT

EwingCole
Architects.Engineers.Interior Designers.Planners
Discovery Business Center
15231 Laguna Canyon Road, Suite 200
Irvine, CA 92618
(949) 417-7550

Addendum No. 001
Project No. 20120401
May 13, 2016

The following changes shall become part of the Contract and shall supersede anything called for previously in the Specifications or shown on the Contract Drawings with which they may be at variance. This Addendum shall be a part of and attached to the Specifications.

SPECIFICATION CHANGES

NEW SPECIFICATION SECTIONS

The following new specification sections are hereby issued this date:

Not Applicable

REISSUED SPECIFICATION SECTIONS

The following specification sections are hereby reissued this date:

000110 – Table of Contents
040513 – Masonry Mortaring
040516 – Masonry Grouting
042000 – Unit Masonry
062000 – Finish Carpentry
089000 – Louvers and Vents
096723.60 – Resinous (Urethane and Epoxy Mortar) Flooring
096800 – Carpeting
265600 – Exterior Lighting
320523 – Cement and concrete for exterior improvements
321416 – Cement and concrete for exterior improvements
16050 - Basic Materials and Methods
Nurse Call Specifications

DRAWING CHANGES

Drawing No. G-000

1. Update / revise Sheet Index.
2.

Drawing No. G-005

1. Revise Phasing Plans.
2. Revise Phasing notes.
3.

Drawing No. A-110

1. Revise Phase 1 Temporary Construction Partition.
2. Revise Key Note #12.
3.

Drawing No. A-200

1. Revise Phase 1 Temporary Construction Partition.
2. Rooms Clean Util 1A-2338 and Soiled Util 1A-236 switched locations.
3. Room 1A-425 revise locker layout for ADA clearances.
4.

Drawing No. A-200A

1. Revise Phase 1 Temporary Construction Partition.
2. Rooms Clean Util 1A-2338 and Soiled Util 1A-236 switched locations.
3.

Drawing No. A-210

1. Revise Phase 1 Temporary Construction Partition.
2. Rooms Clean Util 1A-2338 and Soiled Util 1A-236 switched locations.
3. Room 1A-425 revise locker layout for ADA clearances.
4. Added callout for Exam 15 / remove callout for Exam 14.
5. Revised callout for Men 1A-202, Women 1A-204, Bar Toilet 1A-206, Psych Toilet 1A-225, Bar Toilet 1A-234A, STF TLT/SH 1A-210B and Toilet 1A-237A
6. Revised elevation callout Waiting Room 1A-200.
7.

Drawing No. A-210A

1. Revise Phase 1 Temporary Construction Partition.
2. Rooms Clean Util 1A-2338 and Soiled Util 1A-236 switched locations.
3. Added callout for Exam 15 / remove callout for Exam 14.
4. Revised callout for Men 1A-202, Women 1A-204, Bar Toilet 1A-206, Psych Toilet 1A-225, Bar Toilet 1A-234A, STF TLT/SH 1A-210B, Iso Toilet 1A-233A, Toilet 1A-237A, Toilet 1A-242 and Toilet 1A-256.
5. Revised elevation callout Waiting Room 1A-200.
6.

Drawing No. A-421

1. Added missing Drawing Tittle and Drawing Number to title block.
2.

Drawing No. A-511
1. Updated the Toilet Accessories Legend.
2. Room 1A-425 revise locker layout for ADA clearances.
3. Revised Locker Room A1-425 elevations.

Drawing No. A-514
1. Revise sheet organization.
2.

Drawing No. A-521
1. Revise interior elevations.
2.

Drawing No. A-522
1. Revise rooms Clean Util 1A-2338 and Soiled Util 1A-236
2. Revise interior elevations.
3.

Drawing No. A-523
4. Revise interior elevations.
5.

Drawing No. A-531
1. Detail 3: Remove under counter light fixture.
2. Detail 14: Add dimensions.
3.

Drawing No. A-610
1. Psych Toilet 1A-225 removed above sink light fixture.
2. Psych Toilet 1A-225: Down light added by sink.
3. Toilet 1A-237A removed above sink light fixture.
4. Rooms Clean Util 1A-238 and Soiled Util 1A-236 switched locations.
5.

Drawing No. A-610A
1. Psych Toilet 1A-225 removed above sink light fixture.
2. Psych Toilet 1A-225: Down light added by sink.
3. Toilet 1A-237A removed above sink light fixture.
4. Rooms Clean Util 1A-238 and Soiled Util 1A-236 switched locations.
5.

Drawing No. I-001
1. Revised Finish Schedule.
2. Revised Note #13.
3. Added Note #11.
4.

Drawing No. I-210
1. Added dimensions.
2.

Drawing No. I-210A
1. Added dimensions.
2. Shell Space: Changed a flooring tag.
3.

Drawing No. I-211
1. Changed Note #6.
2. Added Note #9.
3.

Drawing No. I-211A
1. Changed Note #7.
2. Added Note #10.
3.

Drawing No. MD-201
1. Rooms Clean Util 1A-238 and Soiled Util 1A-236 switched locations.
2.

Drawing No. MD-202
1. Rooms Clean Util 1A-238 and Soiled Util 1A-236 switched locations.
2.

Drawing No. P-211
1. Rooms Clean Util 1A-238 and Soiled Util 1A-236 switched locations.
2.

Drawing No. P-402
1. Revised piping and drainage for Clean Util 1A-238, Soiled Util 1A-236, and Psych Toilet 1A-225.
2.

Drawing No. P-403
1. Revised drainage for Women's Toilet 1A-204.
2.

Drawing No. P-701
1. Revised plumbing drain schedule.
2.

Drawing No. E-010
1. Revised demolition note 2.
2. Revised site demolition plan.
3.

Drawing No. E-020
1. Revised keynotes 2 and 6.
2. Revised site lighting plan.
3. Added exterior luminaire schedule.

4.

Drawing No. E-210

1. Revised general note #16.
2. Rooms Clean Util 1A-238 and Soiled Util 1A-236 switched locations
3. Revised circuit number for Exam 2 Room 1A-212, Psych Hold 6 Room 1A-220, Psych Exam 2 Room 1A-227, Psych Exam 2 Room 1A-228, Observation Room 1A-244, Observation Room 1A-246, Exam 19 Room 1A-251, and Iso Exam Room 1A-254.
4. Revised circuitry for Work Station 1A-221 and Work Station 1A-260.
5.

Drawing No. E-310

1. Revised lighting for Men's Restroom 1A-202, Women's Restroom 1A-204, Psych Toilet 1A-225, and Men's Restroom 1A-425A.
2. Revised lighting and panel location at exterior canopy.

Drawing No. E-310A

1. Revised lighting for Shell 1A-200AS, Shell 1A-200S, Office 1A-247, Office 1A-248, Iso Exam 1A-250, Exam 19 1A-251, Exam 16 1A-257, Exam 13 1A-265, and Shell 1A-400S.
2.

Drawing No. E-511

1. Revised notes for light fixtures C1, C2, C3, C4 on schedule.
2.

Drawing No. E-522

1. Revised panel schedules.
2.

Drawing No. E-611.

1. Revised keynote 1
2. Revised single line diagram.
3.

Drawing No. E-612

1. Revised load calculations.
2. Revised single line diagram.
3.

Drawing No. E-711

1. Added detail 8.
2.

NEW DRAWINGS

A-111	I-310	---	---
A-422	---	---	---
A-512	---	---	---
A-513	---	---	---
A-524	---	---	NC-1
A-623	---	---	NC-2

REISSUED DRAWINGS

G-000	A-522	MD-202	E-522
G-005	A-523	P-211	E-611
A-110	A-531	P-402	E-612
A-200	A-610	P-403	E-711
A-200A	A-610A	P-701	---
A-210	I-001	E-010	---
A-210A	I-210	E-020	---
A-421	I-210A	E-210	---
A-511	I-211	E-310	---
A-514	I-211A	E-310A	---
A-521	MD-201	E-511	---

END OF ADDENDUM NO.

DEPARTMENT OF VETERANS AFFAIRS
VHA MASTER SPECIFICATIONS

TABLE OF CONTENTS
Section 00 01 10

07 08 00	Facility Exterior Closure Commissioning	07-10
07 11 13	Bituminous Dampproofing	05-12
07 12 00	Built-Up Bituminous Waterproofing	09-11
07 13 00	Sheet Waterproofing	06-10
07 13 26	Self-Adhering Sheet Waterproofing	
07 13 52	Modified Bituminous Sheet Waterproofing	
07 18 13	Pedestrian Traffic Coatings	09-11
07 21 13	Thermal Insulation	03-09
07 22 00	Roof and Deck Insulation	10-10
07 24 00	Exterior Insulation and Finish Systems	10-11
07 26 00	Under-Slab Vapor Barrier	
07 53 23	Ethylene-Propylene-Diene-Monomer Roofing	10-11
07 60 00	Flashing and Sheet Metal	10-10
07 71 00	Roof Specialties	10-11
07 72 00	Roof Accessories	10-11
07 81 00	Applied Fireproofing	11-11
07 84 00	Firestopping	10-11
07 92 00	Joint Sealants	12-11
07 95 13	Expansion Joint Cover Assemblies	10-11
	DIVISION 08 - OPENINGS	
08 11 13	Hollow Metal Doors and Frames	01-13
08 14 23	Impact Resistant Doors	
08 17 10	Integrated Door Assemblies	02-12
08 31 13	Access Doors and Frames	10-11
08 34 53	Security Doors and Frames	12-09
08 41 13	Aluminum-Framed Entrances and Storefronts	10-11
08 42 43	Intensive Care Unit/Critical Care Unit (ICU/CCU) Entrances	
08 44 13	Glazed Aluminum Curtain Walls	10-11
08 56 53	Blast Resistant Windows	05-12
08 71 00	Door Hardware	09-11
08 71 13	Automatic Door Operators	12-09
08 71 13.11	Low Energy Power Assist Door Operators	01-11
08 80 00	Glazing	10-12
08 90 00	Louvers and Vents	10-11
	DIVISION 09 – FINISHES	
09 22 16	Non-Structural Metal Framing	07-10
09 29 00	Gypsum Board	02-13
09 30 13	Ceramic/Porcelain Tiling	05-12
09 51 00	Acoustical Ceilings	10-10
09 54 23	Linear Metal Ceilings	10-11
09 65 13	Resilient Base and Accessories	10-11
09 65 16	Resilient Sheet Flooring	07-10
09 67 23.60	Resinous (Urethane and Epoxy Mortar) Flooring (RES-6)	05-11
09 68 00	Carpeting	
09 91 00	Painting	04-09
	DIVISION 10 – SPECIALTIES	
10 14 00	Signage	11-11
10 21 13	Toilet Compartments	05-12

10 21 23	Cubicle Curtain Tracks	11-11
10 25 13	Patient Bed Service Walls	11-11
10 26 00	Wall and Door Protection	01-11
10 28 00	Toilet, Bath, and Laundry Accessories	11-11
10 44 13	Fire Extinguisher Cabinets	11-11
10 51 13	Metal Lockers	
10 51 16	Wood Lockers	
	DIVISION 11 – EQUIPMENT	
11 31 00	Residential Appliances	
11 73 00	Ceiling Mounted Patient Lift System	07-10
	DIVISION 12 – FURNISHINGS	
12 24 00	Window Shades	11-11
12 48 13	Entrance Floor Mats/Grills and Frames	
	DIVISION 13 - SPECIAL CONSTRUCTION	
13 05 41	Seismic Restraint Requirements for Non-Structural Components	08-11
13 47 13	Bullet Resistant Fiberglass Panels	
13 49 00	Radiation Protection	07-11
	DIVISION 14– CONVEYING EQUIPEMENT	
14 92 00	Pneumatic Tube System	
	DIVISION 21- FIRE SUPPRESSION	
21 05 11	Common Work Results for Fire Suppression	11-09
21 08 00	Commissioning of Fire Suppression System	07-10
21 13 13	Wet-Pipe Sprinkler Systems	05-08
	DIVISION 22 – PLUMBING	
22 05 11	Common Work Results for Plumbing	04-11
22 05 12	General Motor Requirements for Plumbing Equipment	12-09
22 05 23	General-Duty Valves for Plumbing Piping	12-09
22 07 11	Plumbing Insulation	05-11
22 08 00	Commissioning of Plumbing Systems	07-10
22 11 00	Facility Water Distribution	05-11
22 13 00	Facility Sanitary and Vent Piping	12-09
22 14 00	Facility Storm Drainage	12-09
22 40 00	Plumbing Fixtures	03-11
22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	08-12
22 63 00	Gas Systems for Laboratory and Healthcare Facilities	12-10
	DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	
23 05 11	Common Work Results for HVAC	11-10
23 05 12	General Motor Requirements for HVAC and Steam Generation Equipment	11-10
23 05 41	Noise and Vibration Control for HVAC Piping and	11-10

	Equipment	
23 05 93	**Testing, Adjusting, and Balancing for HVAC**	**05-11**
23 07 11	**HVAC and Boiler Plant Insulation**	**05-11**
23 08 00	**Commissioning of HVAC**	**07-10**
23 09 23	**Direct-Digital Control System for HVAC**	**09-11**
23 21 13	**Hydronic Piping**	**09-12**
23 25 00	**HVAC Water Treatment**	**02-10**
23 31 00	**HVAC Ducts and Casings**	**03-13**
23 34 00	**HVAC Fans**	**11-09**
23 36 00	**Air Terminal Units**	**03-10**
23 37 00	**Air Outlets and Inlets**	**11-09**
23 40 00	**HVAC Air Cleaning Devices**	
23 74 13	**Packaged, Outdoor, Central-Station Air-Handling Units**	**04-11**
23 82 00	**Convection Heating and Cooling Units**	**04-11**
23 82 16	**Air Coils**	
	DIVISION 25 – INTEGRATED AUTOMATION	
	NOT USED	
	DIVISION 26 – ELECTRICAL	
26 05 11	**Requirements for Electrical Installations**	**12-12**
26 05 19	**Low-Voltage Electrical Power Conductors and Cables**	**12-12**
26 05 26	**Grounding and Bonding for Electrical Systems**	**12-12**
26 05 33	**Raceway and Boxes for Electrical Systems**	**09-10**
26 05 41	**Underground Electrical Construction**	**12-01**
26 05 53	**Identification for Electrical Systems**	
26 05 73	**Overcurrent Protective Device Coordination Study**	**12-12**
26 09 23	**Lighting Controls**	**09-10**
26 22 00	**Low-Voltage Transformers**	**12-12**
26 24 13	**Distribution Switchboards**	**12-12**
26 24 16	**Panelboards**	**12-12**
26 27 26	**Wiring Devices**	**12-12**
26 29 21	**Enclosed Switches and Circuit Breakers**	**12-12**
26 43 13	**Surge Protector Device**	**12-12**
26 51 00	**Interior Lighting**	**12-12**
26 56 00	**Exterior Lighting**	**09-10**
	DIVISION 27 – COMMUNICATIONS	
27 05 11	**Requirements for Communications Installations**	**11-09**
27 05 26	**Grounding and Bonding for Communications Systems**	**10-06**
27 05 33	**Raceways and Boxes for Communications Systems**	**12-05**
27 07 44	**Cables – Communication (Copper Communications Network)**	**05-12**
27 08 00	**Commissioning of Communications Systems**	
27 10 00	**Structured Cabling**	**12-05**
27 11 00	**Telecommunications Room Fittings**	
27 15 00	**Communications Horizontal Cabling**	
27 31 00	**Voice Communications Switching and Routing Equipment**	
27 31 31	**Voice Communications Switching and Routing Equipment - Extension**	**10-06**
27 51 16	**Public Address and Mass Notification Systems**	
57 52 23	**Nurse Call and Code Blue Systems**	
27 52 31	**Security Emergency Call, Duress Alarm, and Telecommunications**	**02-09**

27 52 41	**Miscellaneous Medical Systems**	**12-05**
	DIVISION 28 – ELECTRONIC SAFETY AND SECURITY	
28 05 00	**Common Work Results for Electronic Safety and Security**	**09-11**
28 05 13	**Conductors and Cables for Electronic Safety and Security**	**09-11**
28 05 26	**Grounding and Bonding for Electronic Safety and Security**	**09-11**
28 05 28.33	**Conduits and Backboxes for Electronic Safety and Security**	**09-11**
28 08 00	**Commissioning of Electronic Safety and Security Systems**	
28 13 00	**Physical Access Control System**	
28 13 16	**Access Control System and Database Management**	**09-11**
28 13 53	**Security Access Detection**	**09-11**
28 16 00	**Intrusion Detection System**	
28 23 00	**Video Surveillance**	
28 26 00	**Electronic Personal Protection System**	**09-11**
28 31 00	**Fire Detection and Alarm**	**10-11**
28 52 31	**Emergency Call System**	
	DIVISION 31 – EARTHWORK	
31 20 00	**Earth Moving**	**10-12**
31 23 19	**Dewatering**	**10-12**
	DIVISION 32 – EXTERIOR IMPROVEMENTS	
32 05 23	**Cement and Concrete for Exterior Improvements**	**04-10**
32 12 16	**Asphalt Paving**	**10-09**
32 14 16	**Brick Unit Paving**	**04-10**
32 17 23	**Pavement Markings**	**04-10**
32 84 00	**Planting Irrigation**	**10-11**
32 90 00	**Planting**	**10-11**
	DIVISION 33 – UTILITIES	
33 40 00	**Storm Drainage Utilities**	**10-11**
	DIVISION 34 – TRANSPORTATION	
	NOT USED	
	DIVISION 48 – Electrical Power Generation	
	NOT USED	

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

ELECTRONIC SUBMITTAL PROCEDURES

1.1 SUMMARY:

A. Shop drawing and product data submittals shall be transmitted to Architect in electronic (PDF) format using Submittal Exchange, a website service designed specifically for transmitting submittals between construction team members.
B. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
C. The electronic submittal process is not intended for color samples, color charts, or physical material samples.

1.2 PROCEDURS:

A. Submittal Preparation - Contractor may use any or all of the following options:
    1. Subcontractors and Suppliers provide electronic (PDF) submittals to Contractor via the Submittal Exchange website.
    2. Subcontractors and Suppliers provide paper submittals to General Contractor who electronically scans and converts to PDF format.
    3. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to PDF format.
B. Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer / product, dimensions and coordination of information with other parts of the work.
C. Contractor shall transmit each submittal to Architect using the Submittal Exchange website, www.submittalexchange.com.
D. Architect / Engineer review comments will be made available on the Submittal Exchange website for downloading. Contractor will receive email notice of completed review.
E. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.
F. Submit paper copies of reviewed submittals at project closeout for record purposes.

1.3 COST

A. The General Contractor shall include the full cost of Submittal Exchange project subscription in their proposal. This cost is included in the Contract Amount. Contact Bob Caylor at Submittal Exchange at 800-714-0024 x2221 (bob.caylor@texturacorp.com) to verify cost prior to bid.

B. At Contractor's option, training is available from Submittal Exchange regarding use of website and PDF submittals. Contact Submittal Exchange at 1-800-714-0024.

C. Internet Service and Equipment Requirements:

1. Email address and Internet access at Contractor's main office.
2. Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF review software for applying electronic stamps and comments.

- - - E N D - - -

SECTION 04 05 13
MASONRY MORTARING

PART 1 - GENERAL

1.1 DESCRIPTION:

Section specifies mortar materials and mixes.

1.2 RELATED WORK:

A. Mortar used in Section:
   1. Section 03 45 00, PRECAST ARCHITECTURAL CONCRETE.
   2. Section 04 05 16, MASONRY GROUTING.
   3. Section 04 20 00, UNIT MASONRY.
   4. Section 04 05 31, MASONRY TUCK POINTING.
   5. Section 04 72 00, CAST STONE MASONRY.

1.3 TESTING LABORATORY-CONTRACTOR RETAINED

A. Engage a commercial testing laboratory approved by Resident Engineer to perform tests specified below.
B. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to Resident Engineer.

1.4 TESTS

A. Test mortar and materials specified.
B. Certified test reports.
C. Identify materials by type, brand name and manufacturer or by origin.
D. Do not use materials until laboratory test reports are approved by Resident Engineer.
E. After tests have been made and materials approved, do not change without additional test and approval of Resident Engineer.
F. Testing:
   1. Test materials proposed for use for compliance with specifications in accordance with test methods contained in referenced specifications and as follows:
   2. Mortar:
      a. Test for compressive strength and water retention; ASTM C270.
      b. Mortar compressive strengths 28 days as follows:
         Type M: Minimum 17230 kPa (2500 psi) at 28 days.
         Type S: Minimum 12400 kPa (1800 psi) at 28 days.
         Type N: Minimum 5170 kPa (750 psi) at 28 days.
   3. Cement:
      a. Test for water soluble alkali (nonstaining) when nonstaining cement is specified.

b. Nonstaining cement shall contain not more than 0.03 percent water soluble alkali.

4. Sand: Test for deleterious substances, organic impurities, soundness and grading.

5. High Bond Mortar: Test for compressive strength, tensile strength, flexural strength, and brick bond strength.

G. During progress of work, testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES, takes and tests samples as specified in that section. Testing procedures and test methods in ASTM C780.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Certificates:

1. Testing laboratory's facilities and qualifications of its technical personnel.

2. Indicating that following items meet specifications:

a. Portland cement.

b. Masonry cement.

c. Mortar cement.

d. Hydrated lime.

e. Fine aggregate (sand).

C. Laboratory Test Reports:

1. Mortar, each type.

2. Admixtures.

D. Manufacturer's Literature and Data:

1. Cement, each kind.

2. Hydrated lime.

3. Admixtures.

4. Liquid acrylic resin.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.

B. Store masonry materials under waterproof covers on planking clear of ground, and protect damage from handling, dirt, stain, water and wind.

1.7 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

C40-04.....Organic Impurities in Fine Aggregates for Concrete
C91-05.....Masonry Cement
C109-08.....Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-MM Cube Specimens)
C144-04.....Aggregate for Masonry Mortar
C150-09.....Portland Cement
C207-06.....Hydrated Lime for Masonry Purposes
C270-10.....Mortar for Unit Masonry
C307-03(R2008).....Tensile Strength of Chemical - Resistant Mortar, Grouts, and Monolithic Surfacing
C321-00(R2005).....Bond Strength of Chemical-Resistant Mortars
C348-08.....Flexural Strength of Hydraulic Cement Mortars
C595-10.....Blended Hydraulic Cement
C780-10.....Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C979-10.....Pigments for Integrally Colored Concrete
C1329-05.....Mortar Cement

PART 2 - PRODUCTS

2.1 HYDRATED LIME

ASTM C207, Type S.

2.2 AGGREGATE FOR MASONRY MORTAR

A. ASTM C144 and as follows:
   1. Light colored sand for mortar for laying face brick.
   2. White plastering sand meeting sieve analysis for mortar joints for pointing and laying of structural facing tile units except that 100 percent passes No. 8 sieve, and not more than 5 percent retained on No. 16 sieve.

B. Test sand for color value in accordance with ASTM C40. Sand producing color darker than specified standard is unacceptable.

2.3 BLENDED HYDRAULIC CEMENT

ASTM C595, Type IS, IP.

2.4 MASONRY CEMENT

A. ASTM C91. Type N, S, or M.

B. Use white masonry cement whenever white mortar is specified.

2.5 MORTAR CEMEMT

ASTM C1329, Type N, S or M.

2.6 PORTLAND CEMENT

A. ASTM C150, Type I.

B. Use white Portland cement wherever white mortar is specified.

2.7 LIQUID ACRYLIC RESIN

A formulation of acrylic polymers and modifiers in liquid form designed for use as an additive for mortar to improve physical properties.

2.8 WATER

Potable, free of substances that are detrimental to mortar, masonry, and metal.

2.9 POINTING MORTAR

A. For Cast Stone or Precast Concrete: Proportion by volume; One part white Portland cement, two parts white sand, and 1/5 part hydrated lime.

B. Pointing Mortar for Glazed Structural Facing Tile:

1. Proportion by volume: One part white Portland cement, two parts of graded white sand passing Number 50 sieve, and 1/8 part hydrated lime.
2. Pointing mortar in shower: Add aluminum tri-stearate, calcium stearate, or ammonium stearate in amount of two percent of weight of cement used.

2.10 MASONRY MORTAR

A. Conform to ASTM C270.

B. Admixtures:

1. Do not use mortar admixtures, except for high bond mortar, and color admixtures unless approved by Resident Engineer.
2. Submit laboratory test report showing effect of proposed admixture on strength, water retention, and water repellency of mortar.
3. Do not use antifreeze compounds.

C. Colored Mortar:

1. Maintain uniform mortar color for exposed work throughout.
2. Match mortar color in approved sample or mock-up.
3. Color of mortar for exposed work in alteration work to match color of existing mortar unless specified otherwise.

D. Color Admixtures:

1. Proportion as specified by manufacturer.

2.11 HIGH BOND MORTAR

A. Mixture by volume, one-part Portland cement, 1/4-part hydrated lime, three-parts sand, water, and liquid acrylic resin.

B. Mortar properties when tested in accordance with referenced specifications.

1. Compressive Strength, ASTM C109: Minimum 19,305 kPa (2800 psi), using 50 mm (2 inch) cubes.

2. Tensile Strength, ASTM C307: 3861 kPa Minimum (560 psi), using the 25mm (1 inch) briquettes.
3. Flexural Strength, ASTM C348: Minimum 6067 kPa (880 psi), using flexural bar.
4. Bond Strength, ASTM C321: Minimum 2965 kPa (430 psi), using crossed brick.

2.12 COLOR ADMIXTURE

A. Pigments: ASTM C979.
B. Use mineral pigments only. Organic pigments are not acceptable.
C. Pigments inert, stable to atmospheric conditions, nonfading, alkali resistant and water insoluble.

PART 3 - EXECUTION

3.1 MIXING

A. Mix in a mechanically operated mortar mixer.
   1. Mix mortar for at least three minutes but not more than five minutes.
B. Measure ingredients by volume. Measure by the use of a container of known capacity.
C. Mix water with dry ingredients in sufficient amount to provide a workable mixture which will adhere to vertical surfaces of masonry units.
D. Mortar that has stiffened because of loss of water through evaporations:
   1. Re-tempered by adding water to restore to proper consistency and workability.
   2. Discard mortar that has reached its initial set or has not been used within two hours.
E. Pointing Mortar:
   1. Mix dry ingredients with enough water to produce a damp mixture of workable consistency which will retain its shape when formed into a ball.
   2. Allow mortar to stand in dampened condition for one to 1-1/2 hours.
   3. Add water to bring mortar to a workable consistency prior to application.

3.2 MORTAR USE LOCATION

A. Use Type M mortar for waterproof parging below grade.
B. Use Type S mortar for masonry containing vertical reinforcing bars (non-engineered) masonry below grade masonry solar screens and setting cast stone and engineered reinforced unit masonry work.
C. For brick veneer over frame back up walls, use Type N portland cement-lime mortar or Type S masonry cement or mortar cement mortar.

D. Use Type N mortar for other masonry work, except as otherwise specified.

E. Use Type N mortar for tuck pointing work.

F. Use pointing mortar for items specified.

- - - E N D - - -

SECTION 04 05 16
MASONRY GROUTING

PART 1 - GENERAL

1.1 DESCRIPTION:

Section specifies grout materials and mixes.

1.2 RELATED WORK:

A. Grout used in Section:
   1. Section 03 45 00, PRECAST ARCHITECTURAL CONCRETE.
   2. Section 04 20 00, UNIT MASONRY.
   3. Section 04 72 00, CAST STONE MASONRY.

1.3 TESTS:

A. Test grout and materials specified.
B. Certified test reports.
C. Identify materials by type, brand name and manufacturer or by origin.
D. Do not use materials until laboratory test reports are approved by Resident Engineer.
E. After tests have been made and materials approved, do not change without additional test and approval of Resident Engineer.
F. Testing:
   1. Test materials proposed for use for compliance with specifications in accordance with test methods contained in referenced specifications and as follows:
   2. Grout:
      a. Test for compressive strength; ASTM C1019.
      b. Grout compressive strength of 13790 kPa (2000 psi) at 28 days.
   3. Cement:
      a. Test for water soluble alkali (nonstaining) when nonstaining cement is specified.
   4. Sand: Test for deleterious substances, organic impurities, soundness and grading.

1.4 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Certificates:
   1. Indicating that following items meet specifications:
      a. Portland cement.
      b. Masonry cement.
      c. Grout.
      d. Hydrated lime.

e. Fine aggregate (sand).

f. Coarse aggregate for grout.

g. Color admixture.

C. Laboratory Test Reports:

1. Grout, each type.

2. Admixtures.

D. Manufacturer's Literature and Data:

1. Cement, each kind.

2. Hydrated lime.

3. Admixtures.

4. Liquid acrylic resin.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.

B. Store masonry materials under waterproof covers on planking clear of ground, and protect damage from handling, dirt, stain, water and wind.

1.6 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

C40-04.....Organic Impurities in Fine Aggregates for Concrete

C91-05.....Masonry Cement

C150-09.....Portland Cement

C207-06.....Hydrated Lime for Masonry Purposes

C404-07.....Aggregate for Masonry Grout

C476-10.....Grout for Masonry

C595-10.....Blended Hydraulic Cement

C979-10.....Pigments for Integrally Colored Concrete

C1019-11.....Sampling and Testing Grout

PART 2 - PRODUCTS

2.1 HYDRATED LIME:

ASTM C207, Type S.

2.2 AGGREGATE FOR MASONRY GROUT:

ASTM C404, Size 8.

2.3 BLENDED HYDRAULIC CEMENT:

ASTM C595, Type IS, IP.

2.4 MASONRY CEMENT:

A. ASTM C91. Type N, S, or M.

B. Use white masonry cement whenever white mortar is specified.

2.5 PORTLAND CEMENT:

A. ASTM C150, Type I.

B. Use white Portland cement wherever white mortar is specified.

2.6 LIQUID ACRYLIC RESIN:

A formulation of acrylic polymers and modifiers in liquid form designed for use as an additive for mortar to improve physical properties.

2.7 WATER:

Potable, free of substances that are detrimental to grout, masonry, and metal.

2.8 GROUT:

A. Conform to ASTM C476 except as specified.

B. Grout type proportioned by volume as follows:

1. Fine Grout:
   a. Portland cement or blended hydraulic cement: one part.
   b. Hydrated lime: 0 to 1/10 part.
   c. Fine aggregate: 2-1/4 to three times sum of volumes of cement and lime used.
2. Coarse Grout:
   a. Portland cement or blended hydraulic cement: one part.
   b. Hydrated lime: 0 to 1/10 part.
   c. Fine aggregate: 2-1/4 to three times sum of volumes of cement and lime used.
   d. Coarse aggregate: one to two times sum of volumes of cement and lime used.
3. Sum of volumes of fine and coarse aggregates: Do not exceed four times sum of volumes of cement and lime used.

2.9 COLOR ADMIXTURE:

A. Pigments: ASTM C979.

B. Use mineral pigments only. Organic pigments are not acceptable.

C. Pigments inert, stable to atmospheric conditions, nonfading, alkali resistant and water insoluble.

PART 3 - EXECUTION

3.1 MIXING:

A. Mix in a mechanically operated grout mixer.

1. Mix grout for at least five minutes.

B. Measure ingredients by volume. Measure by the use of a container of known capacity.

C. Mix water with grout dry ingredients in sufficient amount to bring grout mixture to a pouring consistency.

3.2 GROUT USE LOCATIONS:

A. Use fine grout for filling wall cavities and cells of concrete masonry units where the smallest dimension is 50 mm (2 inches) or less.

B. Use either fine grout or coarse grout for filling wall cavities and cells of concrete masonry units where the smallest dimension is greater than 50 mm (2 inches).

C. Do not use grout for filling bond beam or lintel units.

- - - E N D - - -

SECTION 04 20 00
UNIT MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies requirements for construction of masonry unit walls.

1.2 RELATED WORK

A. Mortars and grouts: Section 04 05 13, MASONRY MORTARING, Section 04 05 16, MASONRY GROUTING.

B. Steel lintels and shelf angles: Section 05 50 00, METAL FABRICATIONS.

C. Cavity insulation: Section 07 21 13, THERMAL INSULATION.

D. Flashing: Section 07 60 00, FLASHING AND SHEET METAL.

E. Sealants and sealant installation: Section 07 92 00, JOINT SEALANTS.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Samples:

1. Concrete masonry units, when exposed in finish work.
2. Anchors, and ties, one each and joint reinforcing 1200 mm (48 inches) long.

C. Shop Drawings:

1. Special masonry shapes.
2. Drawings, showing reinforcement, applicable dimensions and methods of hanging soffit or lintel masonry and reinforcing masonry for embedment of anchors for hung fixtures.
3. Ceramic glazed structural facing tile or concrete masonry units for typical window and door openings, and, for special conditions as affected by structural conditions.

5. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcing bars. Comply with ACI 315. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

D. Certificates:

1. Certificates signed by manufacturer, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies.
2. Indicating that the following items meet specification requirements:

a. Solid and load-bearing concrete masonry units, including fire-resistant rated units.

3. Testing laboratories facilities and qualifications of its principals and key personnel to perform tests specified.

E. Laboratory Test Reports:

1. Brick for pre-built masonry panels.

F. Manufacturer's Literature and Data:

1. Anchors, ties, and reinforcement.
2. Shear keys.
3. Reinforcing bars.

1.4 SAMPLE PANEL

A. Before starting masonry, lay up a sample panel in accordance with Masonry Standards Joint Committee (MSJC) and Brick Industry Association (BIA).

1. Use masonry units from random cubes of units delivered on site.
2. Include reinforcing, ties, and anchors.

B. Use sample panels approved by Resident Engineer for standard of workmanship of new masonry work.

C. Use sample panel to test cleaning methods.

1.5 WARRANTY

Warrant exterior masonry walls against moisture leaks and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be five years.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

A951-06.....Steel Wire for Masonry Joint Reinforcement.
A615/A615M-09.....Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
A675/A675M-03(R2009)....Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical PropertiesC34-03 Structural Clay Load-Bearing Wall Tile
C55-09.....Concrete Building Brick
C56-10.....Structural Clay Non-Load-Bearing Tile
C62-10.....Building Brick (Solid Masonry Units Made From Clay or Shale)

C67-09.....Sampling and Testing Brick and Structural Clay Tile
C90-11.....Load-Bearing Concrete Masonry Units
C126-10.....Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
C216-10.....Facing Brick (Solid Masonry Units Made From Clay or Shale)
C476-10.....Standard Specification for Grout for Masonry
C612-10.....Mineral Fiber Block and Board Thermal Insulation
C744-11.....Prefaced Concrete and Calcium Silicate Masonry Units.
D1056-07.....Flexible Cellular Materials - Sponge or Expanded Rubber
D2000-08.....Rubber Products in Automotive Applications
D2240-05(R2010).....Rubber Property - Durometer Hardness
D3574-08.....Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams
F1667-11.....Fasteners: Nails, Spikes and Staples

C. Masonry Industry Council:
Hot and Cold Weather Masonry Construction Manual-98 (R2000).

D. American Welding Society (AWS):
D1.4-11 Structural Welding Code – Reinforcing Steel.

E. Federal Specifications (FS):
FF-S-107C-00.....Screws, Tapping and Drive

F. Brick Industry Association - Technical Notes on Brick Construction (BIA):
11-2001.....Guide Specifications for Brick Masonry, Part I
11A–1988.....Guide Specifications for Brick Masonry, Part II
11B–1988.....Guide Specifications for Brick Masonry, Part III Execution
11C-1998.....Guide Specification for Brick Masonry Engineered Brick Masonry, Part IV
11D-1988.....Guide Specifications for Brick Masonry Engineered Brick Masonry, Part IV continued

G. Masonry Standards Joint Committee; Specifications for Masonry Structures TMS 602-08/ACI 530.1-08/ASCE 6-08 (2008 MSJC Book Version TMS-0402-08).

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Hollow and Solid Load-Bearing Concrete Masonry Units: ASTM C90.
1. Unit Weight: lightweight.

2. Fire rated units for fire rated partitions.
3. Sizes: 8 inches thick.
4. For molded faces used as a finished surface, use concrete masonry units with uniform fine to medium surface texture unless specified otherwise.
5. Use bullnose concrete masonry units at corners exposed in finished work with 25 mm (one inch) minimum radius rounded vertical exterior corners (bullnose units).
6. Customized units:
   a. Sound-Absorbing Units:
      1) Vertical slots in face to core areas.
      2) Acoustical absorption insert: Mineral fiber and metal septum, providing unit with NRC rating of 0.70.
   b. Split-face Units:
      1) Split-Rib Units: Rib shapes as shown.
      2) Ground Face Units:
   c. Glazed Face Units: Facing conform to ASTM C744.

B. Concrete Brick: ASTM C55.

2.2 SHEAR KEYS

A. ASTM D2000, solid extruded cross-shaped section of rubber, neoprene, or polyvinyl chloride, with a durometer hardness of approximately 80 when tested in accordance with ASTM D2240, and a minimum shear strength of 3.5 MPa (500 psi).

B. Shear key dimensions: Approximately 70 mm by 8 mm for long flange and 38 mm by 16 mm for short flange (2-3/4 inches by 5/16 inch for long flange, and 1-1/2 inches by 5/8 inch for short flange).

2.3 ANCHORS, TIES, AND REINFORCEMENT

A. Steel Reinforcing Bars: ASTM A615M, deformed bars, grade as shown.

B. Joint Reinforcement:
1. Form from wire complying with ASTM A951.
2. Galvanized after fabrication.
3. Width of joint reinforcement 40 mm (0.16 inches) less than nominal width of masonry wall or partition.
4. Cross wires welded to longitudinal wires.
5. Joint reinforcement at least 3000 mm (10 feet) in length.
6. Joint reinforcement in rolls is not acceptable.
7. Joint reinforcement that is crimped to form drip is not acceptable.
8. Maximum spacing of cross wires 400 mm (16 inch) to longitudinal wires.
9. Ladder Design:

a. Longitudinal wires deformed 5 mm (0.20 inch) diameter wire.
b. Cross wires 4 mm (0.16 inch) diameter.

10. Trussed Design:
    a. Longitudinal and cross wires not less than 4 mm (0.16 inch nominal) diameter.
    b. Longitudinal wires deformed.
11. Multiple Wythes and Cavity wall ties:
    a. Longitudinal wires 4 mm (0.16 inch), two in each wythe with ladder truss wires 4 mm (0.16 inch) overlay, welded to each longitudinal wire.
    b. Longitudinal wires 4 mm (0.16 inch) with U shape 4 mm (0.16 inch) rectangular ties extending into other wythe not less than 75 mm (3 inches) spaced 400 mm o.c. (16 inches). Adjustable type with U shape tie designed to receive 4 mm (0.16 inch) pintle projecting into other wythe 75 mm (3 inches min.).

C. Adjustable Veneer Anchor for Frame Walls:
1. Two piece, adjustable anchor and tie.
2. Anchor and tie may be either type; use only one type throughout.
3. Loop Type:
    a. Anchor: Screw-on galvanized steel anchor strap 2.75 mm (0.11 inch) by 19 mm (3/4 inch) wide by 225 mm (9 inches) long, with 9 mm (0.35 inch) offset and 100 mm (4 inch) adjustment. Provide 5 mm (0.20 inch) hole at each end for fasteners.
    b. Ties: Triangular tie, fabricated of 5 mm (0.20 inch) diameter galvanized cold drawn steel wire. Ties long enough to engage the anchor and be embedded not less than 50 mm (2 inches) into the bed joint of the masonry veneer.
4. Angle Type:
    a. Anchor: Minimum 2 mm (16 gage) thick galvanized steel angle shaped anchor strap. Provide hole in vertical leg for fastener. Provide hole near end of outstanding leg to suit upstanding portion of tie.
    b. Tie: Fabricate from 5 mm (0.20 inch) diameter galvanized cold drawn steel wire. Form "L" shape to be embedded not less than 50 mm (2 inches) into the bed joint of the masonry veneer and provide upstanding leg to fit through hole in anchor and be long enough to allow 50 mm (2 inches) of vertical adjustment.

D. Dovetail Anchors:
1. Corrugated steel dovetail anchors formed of 1.5 mm (0.0598 inch) thick by 25 mm (1 inch) wide galvanized steel, 90 mm (3-1/2 inches)

long where used to anchor 100 mm (4 inch) nominal thick masonry units, 140 mm (5-1/2 inches) long for masonry units more than 100 mm (4 inches) thick.

2. Triangular wire dovetail anchor 100 mm (4 inch) wide formed of 4 mm (9 gage) steel wire with galvanized steel dovetail insert. Anchor length to extend at least 75 mm (3 inches) into masonry, 25 mm (1 inch) into 40 mm (1-1/2 inch) thick units.
3. Form dovetail anchor slots from 0.6 mm (0.0239 inch) thick galvanized steel (with felt or fiber filler).

E. Individual ties:

1. Rectangular ties: Form from 5 mm (3/16 inch) diameter galvanized steel rod to a rectangular shape not less than 50 mm (2 inches) wide by sufficient length for ends of ties to extend within 25 mm (1 inch) of each face of wall. Ties that are crimped to form drip are not permitted.
2. Adjustable Cavity Wall Ties:
   a. Adjustable wall ties may be used at Contractor's option.
   b. Two piece type permitting up to 40 mm (1-1/2 inch) adjustment.
   c. Form ties from 5 mm (3/16 inch) diameter galvanized steel wire.
   d. Form one piece to a rectangular shape 105 mm (4-1/8 inches) wide by length required to extend into the bed joint 50 mm (2 inches).
   e. Form the other piece to a 75 mm (3 inch) long by 75 mm (3 inch) wide shape, having a 75 mm (3 inch) long bent section for engaging the 105 mm (4-1/8 inch) wide piece to form adjustable connection.

F. Wall Ties, (Mesh or Wire):

1. Mesh wall ties formed of ASTM A82, W0.5, 2 mm, (16 gage) galvanized steel wire 13 mm by 13 mm (1/2 inch by 1/2 inch) mesh, 75 mm (3 inches) wide by 200 mm (8 inches) long.
2. Rectangular wire wall ties formed of W1.4, 3 mm, (9 gage) galvanized steel wire 50 mm (2 inches) wide by 200 mm (8 inches) long.

G. Corrugated Wall Tie:

1. Form from 1.5 mm (0.0598 inch) thick corrugated, galvanized steel 30 mm (1-1/4 inches) wide by lengths so as to extend at least 100 mm (4 inches) into joints of new masonry plus 38 mm (1-1/2 inch) turn-up.
2. Provide 5 mm (3/16 inch) hole in turn-up for fastener attachment.

H. Adjustable Steel Column Anchor:

1. Two piece anchor consisting of a 6 mm (1/4 inch) diameter steel rod to be welded to steel with offset ends, rod to permit 100 mm (4 inch) vertical adjustment of wire anchor.

2. Triangular shaped wire anchor 100 mm (4 inches) wide formed from 5 (3/16 inch) diameter galvanized wire, to extend at least 75 mm (3 inches) into joints of masonry.

I. Adjustable Steel Beam Anchor:

1. Z or C type steel strap, 30 mm (1 1/4 inches) wide, 3 mm (1/8 inch) thick.
2. Flange hook not less than 38 mm (1 1/2 inches) long.
3. Length to embed in masonry not less than 50 mm (2 inches) in 100 mm (4 inch) nominal thick masonry and 100 mm (4 inches) in thicker masonry.
4. Bend masonry end not less than 40 mm (1 1/2 inches).

J. Ridge Wall Anchors:

1. Form from galvanized steel not less than 25 mm (1 inch) wide by 5 mm (3/16 inch) thick by 600 mm (24 inches) long, plus 50 mm (2 inch) bends.
2. Other lengths as shown.

2.4 PREFORMED COMPRESSIBLE JOINT FILLER

A. Thickness and depth to fill the joint as specified.

B. Closed Cell Neoprene: ASTM D1056, Type 2, Class A, Grade 1, B2F1.

C. Non-Combustible Type: ASTM C612, Class 5, 1800 degrees F.

2.5 ACCESSORIES

A. Weep Hole Wicks: Glass fiber ropes, 10 mm (3/8 inch) minimum diameter, 300 mm (12 inches) long.

B. Box Board:

1. Mineral Fiber Board: ASTM C612, Class 1.
2. 25 mm (1 inch) thickness.
3. Other spacing material having similar characteristics may be used subject to the Resident Engineer's approval.

C. Masonry Cleaner:

1. Detergent type cleaner selected for each type masonry used.
2. Acid cleaners are not acceptable.
3. Use soapless type specially prepared for cleaning brick or concrete masonry as appropriate.

D. Fasteners:

1. Concrete Nails: ASTM F1667, Type I, Style 11, 19 mm (3/4 inch) minimum length.
2. Masonry Nails: ASTM F1667, Type I, Style 17, 19 mm (3/4 inch) minimum length.
3. Screws: FS-FF-S-107, Type A, AB, SF thread forming or cutting.

2.6 PRE-BUILT MASONRY PANELS

A. Shop fabricated under a controlled environment, in a plant capable of manufacturing, transporting, and storing the finished panels.

B. Fabricate panels to size and configuration shown, conforming to approved shop drawing.

C. Fabricate panels in jigs.

D. Reject panels failing to meet these requirements.

1. Plumb head joints.
2. Panel dimensions tolerances: Accurate to plus 0 mm (0 inch) and minus 6 mm (1/4 inch) in 3600 mm (12 feet).
3. Panels true, free of warp or rack, and plumb on base.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Protection:

1. Cover tops of walls with nonstaining waterproof covering, when work is not in progress. Secure to prevent wind blow off.
2. On new work protect base of wall from mud, dirt, mortar droppings, and other materials that will stain face, until final landscaping or other site work is completed.

B. Cold Weather Protection:

1. Masonry may be laid in freezing weather when methods of protection are utilized.
2. Comply with MSJC and “Hot and Cold Weather Masonry Construction Manual”.

3.2 CONSTRUCTION TOLERANCES

A. Lay masonry units plumb, level and true to line within the tolerances as per MSJC requirements and as follows:

B. Maximum variation from plumb:

1. In 3000 mm (10 feet) - 6 mm (1/4 inch).
2. In 6000 mm (20 feet) - 10 mm (3/8 inch).
3. In 12 000 mm (40 feet) or more - 13 mm (1/2 inch).

C. Maximum variation from level:

1. In any bay or up to 6000 mm (20 feet) - 6 mm (1/4 inch).
2. In 12 000 mm (40 feet) or more - 13 mm (1/2 inch).

D. Maximum variation from linear building lines:

1. In any bay or up to 6000 mm (20 feet) - 13 mm (1/2 inch).
2. In 12 000 mm (40 feet) or more - 19 mm (3/4 inch).

E. Maximum variation in cross-sectional dimensions of columns and thickness of walls from dimensions shown:

1. Minus 6 mm (1/4 inch).

2. Plus 13 mm (1/2 inch).

F. Maximum variation in prepared opening dimensions:

1. Accurate to minus 0 mm (0 inch).
2. Plus 6 mm (1/4 inch).

3.3 INSTALLATION GENERAL

A. Keep finish work free from mortar smears or spatters, and leave neat and clean.

B. Anchor masonry as specified in Paragraph, ANCHORAGE.

C. Wall Openings:

1. Fill hollow metal frames built into masonry walls and partitions solid with mortar as laying of masonry progresses.
2. If items are not available when walls are built, prepare openings for subsequent installation.

D. Tooling Joints:

1. Do not tool until mortar has stiffened enough to retain thumb print when thumb is pressed against mortar.
2. Tool while mortar is soft enough to be compressed into joints and not raked out.
3. Finish joints in exterior face masonry work with a jointing tool, and provide smooth, water-tight concave joint unless specified otherwise.
4. Tool Exposed interior joints in finish work concave unless specified otherwise.

E. Partition Height:

1. Extend partitions at least 100 mm (four inches) above suspended ceiling or to overhead construction where no ceiling occurs.
2. Extend following partitions to overhead construction.
   a. Where noted smoke partitions, FHP (full height partition), and FP (fire partition) and smoke partitions (SP) on drawings.
   b. Both walls at expansion joints.
   c. Corridor walls.
   d. Walls at stairway and stair halls, elevators, dumbwaiters, trash and laundry chute shafts, and other vertical shafts.
   e. Walls at refrigerator space.
   g. Reinforced masonry partitions
3. Extend finish masonry partitions at least four-inches above suspended ceiling and continue with concrete masonry units or structural clay tile to overhead construction:

F. Lintels:

1. Lintels are not required for openings less than 1000 mm (3 feet 4 inches) wide that have hollow metal frames.

2. Openings 1025 mm (3 feet 5 inches) wide to 1600 m (5 feet 4 inches) wide with no structural steel lintel or frames, require a lintel formed of concrete masonry lintel or bond beam units or structural facing tile lintel units filled with grout per ASTM C476 and reinforced with 1- #15m (1-#5) rod top and bottom for each 100 mm (4 inches) of nominal thickness unless shown otherwise.
3. Precast lintels of 25 Mpa (3000 psi) concrete, of same thickness as partition, and with one Number 5 deformed bar top and bottom for each 100 mm (4 inches) of nominal thickness, may be used in lieu of reinforced CMU masonry lintels.
4. Use steel lintels, for openings over 1600 m (5 feet 4 inches) wide, brick masonry, and elevator openings unless shown otherwise.
5. Doors having overhead concealed door closers require a steel lintel, and a pocket for closer box.
6. Length for minimum bearing of 100 mm (4 inches) at ends.
7. Build masonry openings or arches over wood or metal centering and supports when steel lintels are not used.

G. Wall, Furring, and Partition Units:
1. Lay out field units to provide for running bond of walls and partitions, with vertical joints in second course centering on first course units unless specified otherwise.
2. Align head joints of alternate vertical courses.
3. At sides of openings, balance head joints in each course on vertical center lines of openings.
4. Use no piece shorter than 100 mm (4 inches) long.
5. On interior partitions provide a 6 mm (1/4 inch) open joint for caulking between existing construction, exterior walls, concrete work, and abutting masonry partitions.
6. Use not less than 100 mm (4 inches) nominal thick masonry for free standing furring unless shown otherwise.
7. Do not abut existing plastered surfaces except suspended ceilings with new masonry partitions.

H. Use not less than 100 mm (4 inches) nominal thick masonry for fireproofing steel columns unless shown otherwise.

I. Before connecting new masonry with previously laid, remove loosened masonry or mortar, and clean and wet work in place as specified under wetting.

J. When new masonry partitions start on existing floors, machine cut existing floor finish material down to concrete surface.

K. Structural Steel Encased in Masonry:

1. Where structural steel is encased in masonry and the voids between the steel and masonry are filled with mortar, provide a minimum 25 mm (1 inch) mortar free expansion space between the masonry and the steel by applying a box board material to the steel before the masonry is laid.
2. Do not place spacing material where steel is bearing on masonry or masonry is bearing on steel.

L. Chases:
1. Do not install chases in masonry walls and partitions exposed to view in finished work, including painted or coated finishes on masonry.
2. Masonry 100 mm (4 inch) nominal thick may have electrical conduits 25 mm (1 inch) or less in diameter when covered with soaps, or other finishes.
3. Full recess chases after installation of conduit, with mortar and finish flush.
4. When pipes or conduits, or both occur in hollow masonry unit partitions retain at least one web of the hollow masonry units.

M. Wetting and Wetting Test:
1. Test and wet brick or clay tile in accordance with BIA 11B.
2. Do not wet concrete masonry units or glazed structural facing tile before laying.

N. Temporary Formwork: Provide formwork and shores as required for temporary support of reinforced masonry elements.

O. Construct formwork to conform to shape, line and dimensions shown. Make sufficiently tight to prevent leakage of mortar, grout, or concrete (if any). Brace, tie and support as required to maintain position and shape during construction and curing of reinforced masonry.

P. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and all other reasonable temporary loads that may be placed on them during construction.

Q. Allow not less than the following minimum time to elapse after completion of members before removing shores or forms, provided suitable curing conditions have been obtained during the curing period.
1. 10 days for girders and beams.
2. 7 days for slabs.
3. 7 days for reinforced masonry soffits.

3.4 ANCHORAGE

A. Veneer to Frame Walls:
1. Use adjustable veneer anchors.

2. Fasten anchor to stud through sheathing with self drilling and tapping screw, one at each end of loop type anchor.
3. Space anchors not more than 400 mm (16 inches) on center vertically at each stud.

B. Veneer to Concrete Walls:
1. Install dovetail slots in concrete vertically at 600 mm (2 feet) on centers.
2. Locate dovetail anchors at 400 mm (16 inch) maximum vertical intervals.
3. Anchor new masonry facing to existing concrete with corrugated wall ties spaced at 400 mm, (16 inch) maximum vertical intervals, and at 600 mm (2 feet) maximum horizontal intervals. Fasten ties to concrete with power actuated fasteners or concrete nails.

C. Masonry Facing to Backup and Cavity Wall Ties:
1. Use individual ties for new work.
2. Stagger ties in alternate courses, and space at 400 mm (16 inches) maximum vertically, and 600 mm (2 feet) horizontally.
3. At openings, provide additional ties spaced not more than 900 mm (3 feet) apart vertically around perimeter of opening, and within 300 mm (12 inches) from edge of opening.
4. Anchor new masonry facing to existing masonry with corrugated wall ties spaced at 400 mm (16 inch) maximum vertical intervals and at every second masonry unit horizontally. Fasten ties to masonry with masonry nails.
5. Option: Use joint reinforcing for multiple wythes and cavity wall ties spaced not more than 400 mm (16 inches) vertically.
6. Tie interior and exterior wythes of reinforced masonry walls together with individual ties. Provide ties at intervals not to exceed 600 mm (24 inches) on center horizontally, and 400 mm (16 inches) on center vertically. Lay ties in the same line vertically in order to facilitate vibrating of the grout pours.

D. Anchorage of Abutting Masonry:
1. Anchor interior 100 mm (4 inch) thick masonry partitions to exterior masonry walls with wall ties. Space ties at 600 mm (2 foot) maximum vertical intervals. Extend ties 100 mm (4 inches) minimum into masonry.
2. Anchor interior masonry bearing walls or interior masonry partitions over 100 mm (4 inches) thick to masonry walls with rigid wall anchors spaced at 400 mm (16 inch) maximum vertical intervals.

3. Anchor abutting masonry walls and partitions to concrete with dovetail anchors. Install dovetail slots vertically in concrete at centerline of abutting wall or partition. Locate dovetail anchors at 400 mm (16 inch) maximum vertical intervals. Secure anchors to existing wall with two 9 mm (3/8 inch) by 75 mm (3 inch) expansion bolts or two power-driven fasteners.
4. Anchor abutting interior masonry partitions to existing concrete and existing masonry construction, with corrugated wall ties. Extend ties at least 100 mm (4 inches) into joints of new masonry. Fastened to existing concrete and masonry construction, with powder actuated drive pins, nail or other means that provides rigid anchorage. Install anchors at 400 mm (16 inch) maximum vertical intervals.

E. Masonry Furring:
1. Anchor masonry furring less than 100 mm (4 inches) nominal thick to masonry walls or to concrete with corrugated wall ties or dovetail anchors.
2. Space not over 600 mm (2 feet) on centers in both directions.

F. Anchorage to Steel Beams or Columns:
1. Use adjustable beam anchors on each flange.
2. At columns weld the 6 mm (1/4 inch) steel rod to steel columns at 300 mm (12 inch) intervals, and place wire ties in masonry courses at 400 mm (16 inches) maximum vertically.

3.5 REINFORCEMENT

A. Joint Reinforcement:
1. Use as joint reinforcement in CMU wythe of combination brick and CMU, cavity walls, and single wythe concrete masonry unit walls or partitions.
2. Reinforcing may be used in lieu of individual ties for anchoring brick facing to CMU backup in exterior masonry walls.
3. Locate joint reinforcement in mortar joints at 400 mm (16 inch) maximum vertical intervals.
4. Additional joint reinforcement is required in mortar joints at both 200 mm (8 inches) and 400 (16 inches) above and below windows, doors, louvers and similar openings in masonry, except where other type anchors are required for anchorage of masonry to concrete structure.
5. Joint reinforcement is required in every other course of stack bond CMU masonry.
6. Wherever brick masonry is backed up with stacked bond masonry, joint reinforcement is required in every other course of CMU backup, and in corresponding joint of facing brick.

B. Steel Reinforcing Bars:
   1. Install in cells of hollow masonry units where required for vertical reinforcement and in bond beam units for lintels and bond beam horizontal reinforcement. Install in wall cavities of reinforced masonry walls where shown.
   2. Use grade 60 bars if not specified otherwise.
   3. Bond Beams:
      a. Form Bond beams of load-bearing concrete masonry units filled with ASTM C476 grout and reinforced with 2-#15m (#5) reinforcing steel unless shown otherwise. Do not cut reinforcement.
      b. Brake bond beams only at expansion joints and at control joints, if shown.
   4. Stack Bond:
      a. Locate additional joint reinforcement in vertical and horizontal joints as shown.
      b. Anchor vertical reinforcement into the foundation or wall or bond beam below and hold in place.
      c. Provide temporary bracing for walls over 8 ft. tall until permanent horizontal bracing is completed.
   5. Grout openings:
      a. Leave cleanout holes in double wythe walls during construction by omitting units at the base of one side of the wall.
      b. Locate 75 mm x 75 mm (3 in. x 3 in.) min. clean-out holes at location of vertical reinforcement.
      c. Keep grout space clean of mortar accumulation and sand debris. Clean the grout space every day using a high pressure jet stream of water, or compressed air, or industrial vacuum, or by laying wood strips on the metal ties as the wall is built. If wood strips are used, lift strips with wires as the wall progresses and before placing each succeeding course of wall ties.

3.6 BRICK EXPANSION AND CMU CONTROL JOINTS.

A. Provide brick expansion (BEJ) and CMU control (CJ) joints where shown on drawings.
B. Keep joint free of mortar and other debris.
C. Where joints occur in masonry walls.
   1. Install preformed compressible joint filler in brick wythe.
   2. Install cross shaped shear keys in concrete masonry unit wythe with preformed compressible joint filler on each side of shear key unless otherwise specified.

3. Install filler, backer rod, and sealant on exposed faces.

D. Use standard notched concrete masonry units (sash blocks) made in full and half-length units where shear keys are used to create a continuous vertical joint.

E. Interrupt steel joint reinforcement at expansion and control joints unless otherwise shown.

F. Fill opening in exposed face of expansion and control joints with sealant as specified in Section 07 92 00, JOINT SEALANTS.

3.7 BUILDING EXPANSION AND SEISMIC JOINTS

A. Keep joint free of mortar. Remove mortar and other debris.

B. Install non-combustible, compressible type joint filler to fill space completely except where sealant is shown on joints in exposed finish work.

C. Where joints are on exposed faces, provide depth for backer rod and sealant as specified in Section 07 92 00, JOINT SEALANTS, unless shown otherwise.

3.8 ISOLATION SEAL

A. Where full height walls or partitions lie parallel or perpendicular to and under structural beams or shelf angles, provide a separation between walls or partitions and bottom of beams or shelf angles not less than the masonry joint thickness unless shown otherwise.

B. Insert in the separation, a continuous full width strip of non-combustible type compressible joint filler.

C. Where exposed in finish work, cut back filler material in the joint enough to allow for the joint to be filled with sealant material specified in Section 07 92 00, JOINT SEALANTS.

3.9 BRICKWORK

A. Lay clay brick in accordance with BIA Technical Note 11 series.

3.10 CONCRETE MASONRY UNITS

A. Kind and Users:

1. Provide special concrete masonry shapes as required, including lintel and bond beam units, sash units, and corner units. Use solid concrete masonry units, where full units cannot be used, or where needed for anchorage of accessories.

2. Provide solid load-bearing concrete masonry units or grout the cell of hollow units at jambs of openings in walls, where structural members impose loads directly on concrete masonry, and where shown.

3. Provide rounded corner (bullnose) shapes at opening jambs in exposed work and at exterior corners.

4. Do not use brick jambs in exposed finish work.

5. Use concrete building brick only as filler in backup material where not exposed.
6. Masonry assemblies shall meet the required fire resistance in fire rated partitions of type and construction that will provide fire rating as shown.

B. Laying:

1. Lay concrete masonry units with 10 mm (3/8 inch) joints, with a bond overlap of not less than 1/4 of the unit length, except where stack bond is required.
2. Do not wet concrete masonry units before laying.
3. Bond external corners of partitions by overlapping alternate courses.
4. Lay first course in a full mortar bed.
5. Set anchorage items as work progress.
6. Where ends of anchors, bolts, and other embedded items, project into voids of units, completely fill such voids with mortar or grout.
7. Provide a 6 mm (1/4 inch) open joint for caulking between abutting masonry partitions.
8. Lay concrete masonry units with full face shell mortar beds and fill head joint beds for depth equivalent to face shell thickness.
9. Lay concrete masonry units so that cores of units, that are to be filled with grout, are vertically continuous with joints of cross webs of such cores completely filled with mortar. Unobstructed core openings not less than 50 mm (2 inches) by 75 mm (3 inches).
10. Do not wedge the masonry against the steel reinforcing. Minimum 13 mm (1/2 inch) clear distance between reinforcing and masonry units.
11. Install deformed reinforcing bars of sizes shown.
12. Steel reinforcement, at time of placement, free of loose flaky rust, mud, oil, or other coatings that will destroy or reduce bond.
13. Steel reinforcement in place before grouting.
14. Minimum clear distance between parallel bars: One bar diameter.
15. Hold vertical steel reinforcement in place by centering clips, caging devices, tie wire, or other approved methods, vertically at spacings noted.
16. Support vertical bars near each end and at intermediate intervals not exceeding 192 bar diameters.
17. Reinforcement shall be fully encased by grout or concrete.
18. Splice reinforcement or attach reinforcement to dowels by placing in contact and secured or by placing the reinforcement within 1/5 of the required bar splice length.

19. Stagger splices in adjacent horizontal reinforcing bars. Lap reinforcing bars at splices a minimum of 40 bar diameters.
20. Grout cells of concrete masonry units, containing the reinforcing bars, solid as specified under grouting.
21. Cavity and joint horizontal reinforcement may be placed as the masonry work progresses.
22. Rake joints 6 to 10 mm (1/4 to 3/8 inch) deep for pointing with colored mortar when colored mortar is not full depth.

C. Waterproofing Parging:
1. Parge earth side of concrete masonry unit basement walls with mortar applied in two coats, each coat 6 mm (1/4 inch) thick.
2. Clean wall surfaces to receive parging of dirt, oil, or grease, and moisten before application of first coat.
3. Roughen first coat when partially set, permit to hardened for 24 hours, and moisten before application of second coat.
4. Keep second coat damp for at least 48 hours.
5. Thicken parging and round to form a cove at the junction of outside wall face and footing.

3.12 POINTING

A. Fill joints with pointing mortar using rubber float trowel to rub mortar solidly into raked joints.
B. Wipe off excess mortar from joints of glazed masonry units with dry cloth.
C. Finish exposed joints in finish work with a jointing tool to provide a smooth concave joint unless specified otherwise.

3.13 GROUTING

A. Preparation:
1. Clean grout space of mortar droppings before placing grout.
2. Close cleanouts.
3. Install vertical solid masonry dams across grout space for full height of wall at intervals of not more than 9000 mm (30 feet). Do not bond dam units into wythes as masonry headers.
4. Verify reinforcing bars are in cells of units or between wythes as shown.

B. Placing:
1. Place grout by hand bucket, concrete hopper, or grout pump.
2. Consolidate each lift of grout after free water has disappeared but before plasticity is lost.
3. Do not slush with mortar or use mortar with grout.

4. Interruptions:
   a. When grouting must be stopped for more than an hour, top off grout 40 mm (1-1/2 inch) below top of last masonry course.
   b. Grout from dam to dam on high lift method.
   c. A longitudinal run of masonry may be stopped off only by raking back one-half a masonry unit length in each course and stopping grout 100 mm (4 inches) back of rake on low lift method.

C. Puddling Method:
   1. Double wythe masonry constructed grouted in lifts not to exceed 300 mm (12 inches) or less than 50 mm (2 inches) wide.
   2. Consolidate by puddling with a grout stick during and immediately after placing.
   3. Grout the cores of concrete masonry units containing the reinforcing bars solid as the masonry work progresses.

D. Low Lift Method:
   1. Construct masonry to a height of 1.5 m (5 ft) maximum before grouting.
   2. Grout in one continuous operation and consolidate grout by mechanical vibration and reconsolidate after initial water loss and settlement has occurred.

E. High Lift Method:
   1. Do not pour grout until masonry wall has properly cured a minimum of 4 hours.
   2. Place grout in lifts not exceeding 1.5 m (5 ft).
   3. Exception:
      Where the following conditions are met, place grout in lifts not exceeding 3.86 m (12.67 ft).
      a. The masonry has cured for at least 4 hours.
      b. The grout slump is maintained between 254 and 279 mm (10 and 11 in).
      c. No intermediate reinforced bond beams are placed between the top and the bottom of the pour height.
   4. When vibrating succeeding lifts, extend vibrator 300 to 450 mm (12 to 18 inches) into the preceding lift to close any shrinkage cracks or separation from the masonry units.

3.14 PLACING REINFORCEMENT

A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on the Contract

Drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.

B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 25 mm (1 inch), whichever is greater.

C. For columns, piers and pilasters, provide a clear distance between vertical bars as indicated, but not less than 1 1/2 times the nominal bar diameter or 38 mm (1-1/2 inches), whichever is greater. Provide lateral ties as indicated.

D. Splice reinforcement bars where shown; do not splice at other places unless accepted by the Resident Engineer. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.

E. Provide not less than minimum lap as indicated on shop drawings, or if not indicated, as required by governing code.

F. Weld splices where indicated. Comply with the requirements of AWS D1.4 for welding materials and procedures.

G. Embed metal ties in mortar joints as work progresses, with a minimum mortar cover of 15 mm (5/8 inch) on exterior face of walls and 13 mm (1/2 inch) at other locations.

H. Embed prefabricated horizontal joint reinforcement as the work progresses, with a minimum cover of 15 mm (5/8 inch) on exterior face of walls and 13 mm (1/2 inch) at other locations. Lap joint reinforcement not less than 150 mm (6 inches) at ends. Use prefabricated “L” and “T” sections to provide continuity at corners and intersections. Cut and bend joint reinforcement as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

I. Anchoring: Anchor reinforced masonry work to supporting structure as indicated.

J. Anchor reinforced masonry walls to non-reinforced masonry where they intersect.

3.16 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY

A. Do not wet concrete masonry units (CMU).

B. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of

longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 10 mm (3/8 inch) joints.

C. Where solid CMU units are shown, lay with full mortar head and bed joints.

D. Walls:

1. Pattern Bond: Lay CMU wall units in 1/2-running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
3. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.

E. Columns, Piers and Pilasters:

1. Use CMU units of the size, shape and number of vertical core spaces shown. If not shown, use units which provide minimum clearances and grout coverage for number and size of vertical reinforcement bars shown.
2. Provide pattern bond shown, or if not shown, alternate head joints in vertical alignment.
3. Where bonded pilaster construction is shown, lay wall and pilaster units together to maximum pour height specified.

F. Grouting:

1. Use “Fine Grout” per ASTM C476 for filling spaces less than 100 mm (4 inches) in one or both horizontal directions.
2. Use “Coarse Grout” per ASTM C476 for filling 100 mm (4 inch) spaces or larger in both horizontal directions.
3. Grouting Technique: At the Contractor’s option, use either low-lift or high-lift grouting techniques subject to requirements which follow.

G. Low-Lift Grouting:
   1. Provide minimum clear dimension of 50 mm (2 inches) and clear area of 5160 mm^2 (8 square inches) in vertical cores to be grouted.
   2. Place vertical reinforcement prior to grouting of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 3 m (10 feet).
   3. Lay CMU to maximum pour height. Do not exceed 1.5 m (5 foot) height, or if bond beam occurs below 1.5 m (5 foot) height, stop pour 38 mm (1-1/2 in) below top of bond beam.
   4. Pour grout using chute container with spout or pump hose. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 38 mm (1-1/2 inches) below top course of pour.
   5. Bond Beams: Stop grout in vertical cells 38 mm (1-1/2 inches) below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

H. High-Lift Grouting:
   1. Do not use high-lift grouting technique for grouting of CMU unless minimum cavity dimension and area is 75 mm (3 inches) and 6450 mm^2 (10 square inches), respectively.
   2. Provide cleanout holes in first course at all vertical cells which are to be filled with grout.
   3. Use units with one face shell removed and provide temporary supports for units above, or use header units with concrete brick supports, or cut openings in one face shell.
   4. Construct masonry to full height of maximum grout pour specified, prior to placing grout.
   5. Limit grout lifts to a maximum height of 1.5 m (5 feet) and grout pour to a maximum height of 7.3 m (24 feet), for single wythe hollow concrete masonry walls, unless otherwise indicated.
   6. Place vertical reinforcement before grouting. Place before or after laying masonry units, as required by job conditions. Tie vertical reinforcement to dowels at base of masonry where shown and thread CMU over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 3 m (10 feet).
   7. Where individual bars are placed after laying masonry, place wire loops extending into cells as masonry is laid and loosed before

mortar sets. After insertion of reinforcement bar, pull loops and bar to proper position and tie free ends.

8. Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing indicated.
9. Place horizontal beam reinforcement as the masonry units are laid.
10. Embed lateral tie reinforcement in mortar joints where indicated. Place as masonry units are laid, at vertical spacing shown.
11. Where lateral ties are shown in contact with vertical reinforcement bars, embed additional lateral tie reinforcement in mortar joints. Place as shown, or if not shown, provide as required to prevent grout blowout or rupture of CMU face shells, but provide not less than 4.1 mm diameter (8 gage) wire ties spaced 400 mm (16 inches) o.c. for members with 500 mm (20 inches) or less side dimensions, and 200 mm (8 inches) o.c. for members with side dimensions exceeding 500 mm (20 inches).
12. Preparation of Grout Spaces: Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcement and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.
13. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.
14. Place grout by pumping into grout spaces unless alternate methods are acceptable to the Resident Engineer.
15. Limit grout pours to sections which can be completed in one working day with not more than one hour interruption of pouring operation. Place grout in lifts which do not exceed 1.5 m (5 feet). Allow not less than 30 minutes, nor more than one hour between lifts of a given pour. Mechanically consolidate each grout lift during pouring operation.
16. Place grout in lintels or beams over openings in one continuous pour.
17. Where bond beam occurs more than one course below top of pour, fill bond beam course to within 25 mm (1 inch) of vertically reinforced cavities, during construction of masonry.

18. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 38 mm (1-1/2 inches) of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

3.17 CLEANING AND REPAIR

A. General:
   1. Clean exposed masonry surfaces on completion.
   2. Protect adjoining construction materials and landscaping during cleaning operations.
   3. Cut out defective exposed new joints to depth of approximately 19 mm (3/4 inch) and repoint.
   4. Remove mortar droppings and other foreign substances from wall surfaces.

B. Brickwork:
   1. First wet surfaces with clean water, then wash down with a solution of soapless detergent. Do not use muriatic acid.
   2. Brush with stiff fiber brushes while washing, and immediately thereafter hose down with clean water.
   3. Free clean surfaces of traces of detergent, foreign streaks, or stains of any nature.

C. Concrete Masonry Units:
   1. Immediately following setting, brush exposed surfaces free of mortar or other foreign matter.
   2. Allow mud to dry before brushing.

D. Glazed Structural Facing Tile or Brick Units:
   1. Clean as recommended by tile or brick manufacturer. Protect light colored mortar joints from discoloration during cleaning.
   2. Prepare schedule of test locations.

- - - E N D - - -

SECTION 06 20 00
FINISH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies exterior and interior millwork.

B. Items specified.

- Counter Shelf
- Counter or Work Tops with Base Cabinets
- Mounting Strips, Shelves, and Rods

1.2 RELATED WORK

A. Fabricated Metal brackets, bench supports and countertop legs: Section 05 50 00, METAL FABRICATIONS.

B. Framing, furring and blocking: Section 06 10 00, ROUGH CARPENTRY.

C. Wood doors: Section 08 14 00, WOOD DOORS.

D. Color and texture of finish: SCHEDULE FOR FINISHES.

E. Stock Casework: Section 12 32 00, MANUFACTURED WOOD CASEWORK.

F. Other Countertops: Division 11, EQUIPMENT and Division 12, FURNISHINGS.

G. Electrical light fixtures and duplex outlets: Division 26, ELECTRICAL.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings:

1. Millwork items – Half full size scale for sections and details 1:50 (1/4-inch) for elevations and plans.
2. Show construction and installation.

C. Samples:

Plastic laminate finished plywood or particleboard, 150 mm by 300 mm (six by twelve inches).

D. Certificates:

1. Indicating fire retardant treatment of materials meet the requirements specified.
2. Indicating moisture content of materials meet the requirements specified.

E. List of acceptable sealers for fire retardant and preservative treated materials.

F. Manufacturer's literature and data:

1. Finish hardware
2. Sinks with fittings
3. Electrical components

1.4 DELIVERY, STORAGE AND HANDLING

A. Protect lumber and millwork from dampness, maintaining moisture content specified both during and after delivery at site.

B. Store finishing lumber and millwork in weathertight well ventilated structures or in space in existing buildings designated by Resident Engineer. Store at a minimum temperature of 21^{0}C (70^{0}F) for not less than 10 days before installation.

C. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society of Testing and Materials (ASTM):

A36/A36M-08.....Structural Steel

A53-07.....Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless

A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

B26/B26M-09.....Aluminum-Alloy Sand Castings

B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

E84-09.....Surface Burning Characteristics of Building Materials

C. American Hardboard Association (AHA):

A135.4-04.....Basic Hardboard

D. Builders Hardware Manufacturers Association (BHMA):

A156.9-03.....Cabinet Hardware

A156.11-04.....Cabinet Locks

A156.16-02.....Auxiliary Hardware

E. Hardwood Plywood and Veneer Association (HPVA):

HP1-09.....Hardwood and Decorative Plywood

F. National Particleboard Association (NPA):

A208.1-99.....Wood Particleboard

G. American Wood-Preservers' Association (AWPA):

AWPA C1-03.....All Timber Products – Preservative Treatment by Pressure Processes

H. Architectural Woodwork Institute (AWI):

AWI-99.....Architectural Woodwork Quality Standards and Quality Certification Program

I. National Electrical Manufacturers Association (NEMA):
LD 3-05.....High-Pressure Decorative Laminates

J. U.S. Department of Commerce, Product Standard (PS):
PS20-05.....American Softwood Lumber Standard

K. Military Specification (Mil. Spec):
MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated

L. Federal Specifications (Fed. Spec.):
A-A-1922A.....Shield Expansion
A-A-1936.....Contact Adhesive
FF-N-836D.....Nut, Square, Hexagon Cap, Slotted, Castle
FF-S-111D(1).....Screw, Wood
MM-L-736(C).....Lumber, Hardwood

PART 2 - PRODUCTS

2.1 LUMBER

A. Grading and Marking:
1. Lumber shall bear the grade mark, stamp, or other identifying marks indicating grades of material.
2. Such identifying marks on a material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
3. The inspection agency for lumber shall be approved by the Board of Review, American Lumber Standards Committee, to grade species used.

B. Sizes:
1. Lumber Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which product is produced.
2. Millwork, standing and running trim, and rails: Actual size as shown or specified.

C. Hardwood: MM-L-736, species as specified for each item.

D. Softwood: PS-20, exposed to view appearance grades:
1. Use C select or D select, vertical grain for transparent finish including stain transparent finish.
2. Use Prime for painted or opaque finish.

E. Use edge grain Wood members exposed to weather.

2.2 PLYWOOD

A. Softwood Plywood:
1. Prod. Std.
2. Grading and Marking:

a. Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood.
b. The mark shall identify the plywood by species group or identification index, and shall show glue type, grade, and compliance with PS1.

3. Plywood, 13 mm (1/2 inch) and thicker; not less than five ply construction, except 32 mm (1-1/4 inch) thick plywood not less than seven ply.
4. Plastic Laminate Plywood Cores:
   a. Exterior Type, and species group.
   b. Veneer Grade: A-C.
5. Shelving Plywood:
   a. Interior Type, any species group.
   b. Veneer Grade: A-B or B-C.
6. Other: As specified for item.

B. Hardwood Plywood:
1. HPVA: HP.1
2. Species of face veneer shall be as shown or as specified in connection with each particular item.
3. Inside of Building:
   a. Use Type II (interior) A grade veneer for transparent finish.
   b. Use Type II (interior) Sound Grade veneer for paint finish.
4. On Outside of Building:
   a. Use Type I, (exterior) A Grade veneer for natural or stained and varnish finish.
   b. Use Type I, (exterior) Sound Grade veneer for paint finish.
5. Use plain sliced red oak unless specified otherwise.

2.3 PARTICLEBOARD

A. NPA A208.1
B. Plastic Laminate Particleboard Cores:
1. Use Type 1, Grade 1-M-3, or Type 2, Grade 2-M-2, unless otherwise specified.
2. Use Type 2, Grade 2-M-2, exterior bond, for tops with sinks.

C. General Use: Type 1, Grade 1-M-3 or Type 2, Grade 2-M-2.

2.4 PLASTIC LAMINATE

A. NEMA LD-3.
B. Exposed decorative surfaces including countertops, both sides of cabinet doors, and for items having plastic laminate finish. General Purpose, Type HGL.

C. Cabinet Interiors including Shelving: Both of following options to comply with NEMA, CLS as a minimum.
   1. Plastic laminate clad plywood or particle board.
   2. Resin impregnated decorative paper thermally fused to particle board.
D. Backing sheet on bottom of plastic laminate covered wood tops: Backer, Type HGP.
E. Post Forming Fabrication, Decorative Surfaces: Post forming, Type HGP.

2.5 BUILDING BOARD (HARDBOARD)

A. ANSI/AHA A135.4, 6 mm (1/4 inch) thick unless specified otherwise.
B. Perforated hardboard (Pegboard): Type 1, Tempered perforated 6 mm (1/4 inch) diameter holes, on 25 mm (1 inch) centers each way, smooth surface one side.
C. Wall paneling at gas chain rack: Type 1, tempered, Fire Retardant treated, smooth surface on side.

2.6 ADHESIVE

A. For Plastic Laminate: Fed. Spec. A-A-1936.
B. For Interior Millwork: Unextended urea resin, unextended melamine resin, phenol resin, or resorcinol resin.
C. For Exterior Millwork: Unextended melamine resin, phenol resin, or resorcinol resin.

2.7 STAINLESS STEEL

ASTM A167, Type 302 or 304.

2.8 ALUMINUM CAST

ASTM B26

2.9 ALUMINUM EXTRUDED

ASTM B221

2.10 HARDWARE

A. Rough Hardware:
   1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electric-galvanizing process. Galvanized where specified.
   2. Use galvanized coating on ferrous metal for exterior work unless non-ferrous metals or stainless is used.
   3. Fasteners:
      a. Bolts with Nuts: FF-N-836.
      b. Expansion Bolts: A-A-1922A.
      c. Screws: Fed. Spec. FF-S-111.
B. Finish Hardware
   1. Cabinet Hardware: ANSI A156.9.

a. Door/Drawer Pulls: B02011. Door in seismic zones: B03182.
b. Drawer Slides: B05051 for drawers over 150 mm (6 inches) deep, B05052 for drawers 75 mm to 150 mm 3 to 6 inches) deep, and B05053 for drawers less than 75 mm (3 inches) deep.
c. Sliding Door Tracks: B07063.
d. Adjustable Shelf Standards: B4061 with shelf rest B04083.
e. Concealed Hinges: B1601, minimum 110 degree opening.
f. Butt Hinges: B01361, for flush doors, B01381 for inset lipped doors, and B01521 for overlay doors.
g. Cabinet Door Catch: B0371 or B03172.
h. Vertical Slotted Shelf Standard: B04103 with shelf brackets B04113, sized for shelf depth.

2. Cabinet Locks: ANSI A156.11.
   a. Drawers and Hinged Door: E07262.
   b. Sliding Door: E07162.
3. Auxiliary Hardware: ANSI A156.16.
   a. Shelf Bracket: B04041, japanned or enameled finish.
   b. Combination Garment rod and Shelf Support: B04051 japanned or enamel finish.
   c. Closet Bar: L03131 chrome finish of required length.
   d. Handrail Brackets: L03081 or L03101.
      1) Cast Aluminum, satin polished finish.
      2) Cast Malleable Iron, japanned or enamel finish.
4. Steel Channel Frame and Leg supports for Counter top. Fabricated under Section 05 50 00, METAL FABRICATIONS.
5. Thru-Wall Counter Brackets:
   a. Steel angles drilled for fasteners on 100 mm (4 inches) centers.
   b. Baked enamel prime coat finish.
6. Primers: Manufacturer's standard primer for steel providing baked enamel finish.

2.11 MOISTURE CONTENT

A. Moisture content of lumber and millwork at time of delivery to site.
   1. Interior finish lumber, trim, and millwork 32 mm (1-1/4 inches) or less in nominal thickness: 12 percent on 85 percent of the pieces and 15 percent on the remainder.
   2. Exterior treated or untreated finish lumber and trim 100 mm (4 inches) or less in nominal thickness: 15 percent.
   3. Moisture content of other materials shall be in accordance with the standards under which the products are produced.

2.12 FIRE RETARDANT TREATMENT

A. Where wood members and plywood are specified to be fire retardant treated, the treatment shall be in accordance with Mil. Spec. MIL-L19140.

B. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings.

C. Each piece of treated material shall bear identification of the testing agency and shall indicate performance in accordance with such rating of flame spread and smoke developed.

D. Treat wood for maximum flame spread of 25 and smoke developed of 25.

E. Fire Resistant Softwood Plywood:

1. Use Grade A, Exterior, plywood for treatment.
2. Meet the following requirements when tested in accordance with ASTM E84.
   a. Flame spread: 0 to 25.
   b. Smoke developed: 100 maximum

F. Fire Resistant Hardwood Plywood:

1. Core: Fire retardant treated softwood plywood.
2. Hardwood face and back veneers untreated,
3. Factory seal panel edges, to prevent loss of fire retardant salts.

2.13 PRESERVATIVE TREATMENT

Wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including wood members used for rough framing of millwork items except heart-wood Redwood and Western Red Cedar shall be preservative treated in accordance with AWPA Standards.

B. Use Grade A, exterior plywood for treatment.

2.14 FABRICATION

A. General:

1. Except as otherwise specified, use AWI Custom Grade for architectural woodwork and interior millwork.
2. Finish woodwork shall be free from pitch pockets.
3. Except where special profiles are shown, trim shall be standard stock molding and members of the same species.
4. Plywood shall be not less than 13 mm (1/2 inch), unless otherwise shown or specified.
5. Edges of members in contact with concrete or masonry shall have a square corner caulking rebate.
6. Fabricate members less than 4 m (14 feet) in length from one piece of lumber, back channeled and molded a shown.
7. Plastic Laminate Work:

a. Factory glued to either a plywood or a particle board core, thickness as shown or specified.
b. Cover exposed edges with plastic laminate, except where aluminum, stainless steel, or plastic molded edge strips are shown or specified. Use plastic molded edge strips on 19 mm (3/4-inch) molded thick or thinner core material.
c. Provide plastic backing sheet on underside of countertops, vanity tops, thru-wall counter and sills including back splashes and end splashes of countertops.
d. Use backing sheet on concealed large panel surface when decorative face does not occur.

B. Mounting Strips, Shelves and Rods:
1. Plastic laminate covered, 19 mm (3/4 inch) thick plywood or particle board core with edges and ends having plastic molded edge strips. Size, finish and number as shown.
2. Rod or Closet Bar: L03131. Combination Garment and Shelf Support, intermediate support for closet bar: B04051 for rods over 1800 mm (6 feet) long.

C. Base Cabinets:
1. Fabricate to AWI premium grade construction in conformance with AWI Section 400, CASEWORK.
2. Use softwood for structural framing member's standard sizes, space not over 400 mm (16 inches) on center.
3. Use drawer guides on drawers with pulls.
4. Use pulls and concealed hinges on doors.
5. Use adjustable shelf standards with shelf rests.
6. Use solid surface for all counters and transaction tops with decorative plastic laminate on all remaining exposed surfaces including interior of cupboard cabinet. All solid surface counters to include backsplash and be self-edging.
7. Overlay frame of apron with drawer and door face.
8. Provide cut outs for electrical devices and outlets.

D. Thru-Wall Counter or Pass Thru Counter.
1. Fabricate counter as shown with solid surface continuous tops with metal wall supports as shown.

E. Counter or Work Tops:
1. Fabrication with solid surface over plywood unless shown otherwise.
a. Assemble back splash and end splash to counter top, finished to match.
b. Use one piece counters for straight runs.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

A. Maintain work areas and storage areas to a minimum temperature of 21^{0}C (70^{0}F) for not less than 10 days before and during installation of interior millwork.

B. Do not install finish lumber or millwork in any room or space where wet process systems such as concrete, masonry, or plaster work is not complete and dry.

3.2 INSTALLATION

A. General:

1. Secure trim with fine finishing nails, screws, or glue as required.
2. Set nails for putty stopping. Use washers under bolt heads where no other bearing plate occurs.
3. Seal cut edges of preservative and fire retardant treated wood materials with a certified acceptable sealer.
4. Coordinate with plumbing and electrical work for installation of fixtures and service connections in millwork items.
5. Plumb and level items unless shown otherwise.

67. Nail finish at each blocking, lookout, or other nailer and intermediate points; toggle or expansion bolt in place where nails are not suitable.

B. Base Cabinets:

1. Secure framing to floor with expansion bolts.
2. Secure counter top to support with wood cleats or metal angles screwed on 150 mm (6 inch) centers.
3. Conceal fasteners on corridor side. Exposed fasteners permitted under counter top and in knee spaces on staff side.

C. Shelves:

1. Install mounting strip at back wall and end wall for shelves in closets where shown secured with toggle bolts at each end and not over 600 mm (24 inch) centers between ends.
   a. Nail Shelf to mounting strip at ends and to back wall strip at not over 900 mm (36 inches) on center.
   b. Install metal bracket, ANSI A156.16, B04041, not over 1200 mm (4 feet) centers when shelves exceed 1800 mm (6 feet) in length.
   c. Install metal bracket, ANSI A156.16, B04051, not over 1200 mm (4 feet) on centers where shelf length exceeds 1800 mm (6 feet) in length with metal rods, clothes hanger bars ANSI A156.16, L03131, of required length, full length of shelf.

2. Install vertical slotted shelf standards, ANSI A156.9, B04103 to studs with toggle bolts through each fastener opening. Double slotted shelf standards may be used where adjacent shelves terminate.
   a. Install brackets ANSI A156.9, B04113, providing supports for shelf not over 900 mm (36 inches) on center and within 13 mm (1/2 inch) of shelf end unless shown otherwise.
   b. Install shelves on brackets so front edge is restrained by bracket.

- - - E N D - - -

SECTION 08 90 00
Llouvers and vents

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies fixed and operable wall louvers, door louvers and wall vents.

1.2 RELATED WORK

A. Louvers in steel doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.

B. Louvers in lead lined wood doors: Section 13 49 00, RADIATION PROTECTION.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings:
Each type, showing material, finish, size of members, method of assembly, and installation and anchorage details.

C. Manufacturer's Literature and Data:
Each type of louver and vent.

1.4 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. The Master Painters Institute (MPI):
Approved Product List – September 2011

C. American Society for Testing and Materials (ASTM):
A167-99(R2009).....Stainless and Heat-Resisting Chromium - Nickel Steel Plate, Sheet, and Strip
A1008/A1008M-10.....Steel, Sheet, Carbon, Cold Rolled, Structural, and High Strength Low-Alloy with Improved Formability
B209/B209M-03(R2007)....Aluminum and Aluminum Alloy, Sheet and Plate
B221-08.....Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
B221M-07.....Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Shapes, and Tubes

D. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06.....Metal Finishes Manual

E. National Fire Protection Association (NFPA):

90A-09.....Installation of Air Conditioning and Ventilating Systems

G. American Architectural Manufacturers Association (AAMA):

2605-11.....High Performance Organic Coatings on Architectural Extrusions and Panels

H. Air Movement and Control Association, Inc. (AMCA):

500-L-07.....Testing Louvers

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum, Extruded: ASTM B221/B221M.

B. Stainless Steel: ASTM A167, Type 302B.

C. Carbon Steel: ASTM A1008/A1008M.

D. Aluminum, Plate and Sheet: ASTM B209/B209M.

E. Fasteners: Fasteners for securing louvers and wall vents to adjoining construction, except as otherwise specified or shown, shall be toggle or expansion bolts, of size and type as required for each specific type of installation and service condition.

1. Where type, size, or spacing of fasteners is not shown or specified, submit shop drawings showing proposed fasteners, and method of installation.
2. Fasteners for louvers, louver frames, and wire guards shall be of stainless steel or aluminum.

F. Inorganic Zinc Primer: MPI No. 19.

2.2 EXTERIOR WALL LOUVERS

A. General:

1. Provide fixed type louvers of size and design shown.
2. Heads, sills and jamb sections shall have formed caulking slots or be designed to retain caulking. Head sections shall have exterior drip lip, and sill sections an integral water stop.
3. Furnish louvers with sill extension or separate sill as shown.
4. Frame shall be mechanically fastened or welded construction with welds dressed smooth and flush.

B. Performance Characteristics:

1. Weather louvers shall have a minimum of 50 percent free area and shall pass 700 (fpm) free area velocity at a pressure drop not exceeding 0.1 (inch) water gage and carry not more than 0.05 (ounces) of water per (square foot) of free area for 15 minutes when tested per AMCA Standard 500-L.
2. Louvers shall bear AMCA certified rating seals for air performance and water penetration ratings.

C. Aluminum Louvers:

1. General: Frames, blades, sills and mullions (sliding interlocking type); 2 mm (0.081-inch) thick extruded aluminum. Blades shall be drainable type and have reinforcing bosses.
2. Louvers, fixed: Make frame sizes 13 mm (1/2-inch) smaller than openings. Single louvers frames shall not exceed 1700 mm (66 inches) wide. When openings exceed 1700 mm (66 inches), provide twin louvers separated by mullion members.

2.3 CLOSURE ANGLES AND CLOSURE PLATES

A. Fabricate from 2 mm (0.074-inch) thick stainless steel or aluminum.

B. Provide continuous closure angles and closure plates on inside head, jambs and sill of exterior wall louvers.

C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as specified.

2.4 WIRE GUARDS

A. Provide wire guards on outside of all exterior louvers, except on exhaust air louvers.

B. Fabricate frames from 2 mm (0.081-inch) thick extruded or sheet aluminum 1.5 mm (0.059-inch) thick stainless steel designed to retain wire mesh.

C. Wire mesh shall be woven from not less than 1.3 mm (0.05-inch) diameter stainless steel wire in 13 mm (1/2-inch) square mesh.

D. Miter corners and join by concealed corner clips or locks extending about 57 mm (2-1/4 inches) into rails and stiles. Equip wire guards over four feet in height with a mid-rail constructed as specified for frame components.

E. Fasten frames to outside of louvers with aluminum or stainless steel devices designed to allow removal and replacement without damage to the wire guard or the louver.

2.5 EXTERIOR DOOR LOUVERS

A. Fabricate of 1.6 mm (0.063-inch) thick extruded aluminum. Miter frames at corners and join by concealed corner brackets.

B. Equip louvers on outside with wire guards, except omit wire guards for louvers in doors located completely below enclosed areaways.

2.6 INTERIOR DOOR LOUVERS

A. Fabricate louvers for interior doors of 1.6 mm (0.063-inch) thick extruded aluminum.

B. Make louvers sight-proof type with stationary blades.

2.7 AIR INTAKE VENTS

A. Fabricate exterior louvered wall ventilators for fresh air intake for air conditioning units from extruded aluminum, ASTM B221. Form with

integral horizontal louvers and frame, with drip extending beyond face of wall and integral water stops.

2.8 FINISH

A. In accordance with NAAMM Metal Finishes Manual: AMP 500-505

B. Aluminum Louvers:

1. Anodized finish

2. Organic Finish: AAMA 2605 (Fluorocarbon coating).

C. Stainless Steel: Mechanical finish No. 4 in accordance with NAAMM Metal Finishes Manual.

2.9 PROTECTION

A. Provide protection for aluminum against galvanic action wherever dissimilar materials are in contact, by painting the contact surfaces of the dissimilar material with a heavy coat of bituminous paint (complete coverage), or by separating the contact surfaces with a performed synthetic rubber tape having pressure sensitive adhesive coating on one side.

B. Isolate the aluminum from plaster, concrete and masonry by coating aluminum with zinc-chromate primer.

C. Protect finished surfaces from damage during fabrication, erection, and after completion of the work. Strippable plastic coating on colored anodized finish is not approved.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set work accurately, in alignment and where shown. Items shall be plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.

B. Furnish setting drawings and instructions for installation of anchors and for the positioning of items having anchors to be built into masonry construction. Provide temporary bracing for such items until masonry is set.

C. Provide anchoring devices and fasteners as shown and as necessary for securing louvers to building construction as specified. Power actuated drive pins may be used, except for removal items and where members would be deformed or substrate damaged by their use.

D. Generally, set wall louvers in walls during progress of the work. If wall louvers are not delivered to job in time for installation in prepared openings, make provision for later installation.

3.2 CLEANING AND ADJUSTING

A. After installation, all exposed prefinished and plated items and all items fabricated from stainless steel and aluminum shall be cleaned as

recommended by the manufacturer and protected from damage until completion of the project.

- - - E N D - - -

SECTION 09 67 23.60
RESINOUS (URETHANE AND EPOXY MORTAR) FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies Resinous epoxy mortars flooring:
   1. High Abuse Non-Climatic Troweled and Sealed Epoxy Mortar Flooring System.

1.2 RELATED WORK

A. Concrete and Moisture Vapor Barrier: Section 03 30 00, CAST-IN-PLACE CONCRETE.
B. Color and location of each type of resinous (urethane and epoxy mortar) flooring: As indicated in SCHEDULE FOR FINISHES.
C. Floor Drains: Division 22, PLUMBING.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
   1. Description of each product to be provided.
   2. Application and installation instructions.
   3. Maintenance Instructions: Submit manufacturer’s written instructions for recommended maintenance practices.
C. Qualification Data: For Installer.
D. Sustainable Submittal:
   1. Product data for products having recycled content, submit documentation indicating percentages by weight of postconsumer and pre consumer recycled content.
      a. Include statements indicating costs for each product having recycled content, and low emitting materials.
   2. Product data for field applied, interior, paints, coatings, and primers, include printed statement of VOC content indicating compliance with environmental requirements.
E. Samples:
   1. Each color and texture specified on Drawing I-001.
   2. Samples for verification: For each (color and texture) resinous flooring system required, 6 inches (152 mm) square, applied to a rigid backing by installer for this project.
   3. Sample showing construction from substrate to finish surface in thickness specified and color and texture of finished surfaces. Finished flooring must match the approved samples in color and texture.

F. Shop Drawings: Include plans, sections, component details, and attachment to other trades. Indicate layout of the following:
   1. Patterns.
   2. Edge configuration.
G. Certifications and Approvals:
   1. Manufacturer's certification of material and substrate compliance with specification.
   2. Manufacturer's approval of installer.
   3. Contractor's certificate of compliance with Quality Assurance requirements.
H. Warranty: As specified in this section.

1.4 QUALITY ASSURANCE

A. Manufacture Certificate: Manufacture shall certify that a particular resinous flooring system has been manufactured and in use for a minimum of five (5) years.
B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this project for a minimum period of five (5) years, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
   1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
   2. Contractor shall have completed at least five (5) projects of similar size and complexity. Include list of at least five (5) projects. List must include owner (purchaser); address of installation, contact information at installation project site; and date of installation.
   3. Installer's Personnel: Employ persons trained for application of specified product.
C. Source Limitations:
   1. Obtain primary resinous flooring materials including primers, resins, hardening agents, grouting coats and finish or sealing coats from a single manufacturer.
   2. Provide secondary materials, including patching and fill material, joint sealant, and repair material of type and from source recommended by manufacturer of primary materials.
D. Pre-Installation Conference:
   1. Convene a meeting not less than thirty days prior to starting work.
   2. Attendance:

a. Contractor
b. VA Resident Engineer
c. Manufacturer and Installer's Representative

3. Review the following:
   a. Environmental requirements
      1) Air and surface temperature
      2) Relative humidity
      3) Ventilation
      4) Dust and contaminates
   b. Protection of surfaces not scheduled to be coated
   c. Inspect and discus condition of substrate and other preparatory work performed
   d. Review and verify availability of material; installer’s personnel, equipment needed
   e. Edge conditions.
   f. Performance of the coating with chemicals anticipated in the area receiving the resinous epoxy mortar/cement flooring system
   g. Application and repair
   h. Field quality control
   i. Cleaning
   j. Protection of coating systems
   k. One-year inspection and maintenance
   l. Coordination with other work

E. Manufacturer’s Field Services: Manufacturer’s representative shall provide technical assistance and guidance for surface preparation and application of resinous flooring systems.

F. Contractor Job Site Log: Contractor shall document daily; the work accomplished environmental conditions and any other condition event significant to the long term performance of the urethane and epoxy mortar/cement flooring materials installation. The Contractor shall maintain these records for one year after Substantial Completion.

G. Volatile Organic Compound content to remain under 100g/liter.

1.5 MATERIAL PACKAGING DELIVERY AND STORAGE

A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.

B. Protect materials from damage and contamination in storage or delivery, including moisture, heat, cold, direct sunlight, etc.

C. Maintain temperature of storage area between 60 and 80 degrees F (15 and 26 degrees C).

D. Keep containers sealed until ready for use.

E. Do not use materials beyond manufacturer’s shelf life limits.

F. Package materials in factory pre-weighed and in single, easy to manage batches sized for ease of handling and mixing proportions from entire package or packages. No On site weighing or volumetric measurements are allowed.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring applications.

1. Maintain material and substrate temperature between 65 and 85 degrees F (18 and 30 degrees C) during resinous flooring application and for not less than 24 hours after application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

1.7 WARRANTY

A. Work subject to the terms of the Article “Warranty of Construction” FAR clause 52.246-21.

B. Warranty: Manufacture shall furnish a single, written warranty covering the full assembly (including substrata) for both material and workmanship for a extended period of three (3) full years from date of installation, or provide a joint and several warranty signed on a single document by manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of three (3) full years from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

1.8 APPLICABLE PUBLICATIONS

A. The publication listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

B221-08.....Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

C307-03 (2008).....Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings

C413-01(2006).....Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes

C531-00(2005).....Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

C579-01(2006).....Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

C580-02(2008).....Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

C811-98(2008).....Standard Practice for Surface Preparation of Concrete for Application of Chemical-Resistant Resin Monolithic Surfacings

D1308-02(2007).....Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes

D2047-04 .....Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine

D2240-05.....Standard Test Method for Rubber Property — Durometer Hardness

D4060-07.....Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

D4226-09.....Standard Test Methods for Impact Resistance of Rigid Poly(Vinyl Chloride) (PVC) Building Products

D7234-05.....Standard Test Methods for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers

F1869-09.....Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

F2170-09.....Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

C. National Association of Architectural Metal Manufacturers (NAAMM):

AMP 501.....Finishes for Aluminum

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION (HEAVY DUTY – NON CLIMATIC)

A. System Description:

1. Epoxy resinous Troweled mortar includes: concrete epoxy primers, three component, 100% solids resin, amine and quartz aggregate mortar, and associated 100% solids general service epoxy sealer. Optional: aliphatic polyurethane sealer finish coat for higher UV stability, and chemical resistance. Texture dependant on use of areas.

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.

C. System Components: Verify specific requirements as systems vary by manufacturer. Verify mortar base product, build up layers of broadcast systems will not be accepted. Verify compatibility with substrate. Use manufacturer’s standard components, compatible with each other and as follows:

1. Primer (Bond Coat): Verify inclusion of primer in manufacturer’s system.
   a. Resin: Epoxy.
   b. Formulation Description: 100 percent solids.
   c. Application Method: Apply by Squeegee and back roller.
      1) Coats: Single (one).
2. Mortar:
   a. Resin: Epoxy with rapidly renewable resin components.
   b. Formulation Description: 100 percent solids.
   c. Application Method: Verify specific requirements as systems vary by manufacturer.
      1) Trowel application only:
         a) Thickness of coats: Nominal 3/16 to 1/4 inch (4.76 to 6.35 mm).
         b) Number of coats: One.

2) Slurry application: Not accepted for non-climatic finish.

d. Aggregates: Quartz/silica blend.

3. Topcoat:

a. Resin: Epoxy.

b. Formulation Description: 100 percent solids.

c. Application Method: Squeegee and finish roll.

1) Thickness of coats: 3 mils.

2) Number of Coats: one (aggressive texture profiles may require more than one coat)

d. Aggregates: For added slip resistance dependant on area.

1) Dry silica sand (30 Mesh or larger).

2) Aluminum oxide.

D. System Characteristics:

1. Color and Pattern: As selected by Resident Engineer from manufacturer's standard colors.

2. Overall System Thickness: Nominal 3/16 to 1/4 inches (4.76 to 6.35 mm).

3. Finish: standard.

4. Temperature Range: Systems vary by manufacturer; approximate range from a minimum of 45 to 150 degrees F.

E. Physical Properties:

1.Physical Properties of flooring system when tested as follows:

Property	Test	Value
Compressive Strength	ASTM C579	6,000 psi after 7 days
Tensile Strength	ASTM C307	1,500 psi
Flexural Strength	ASTM C580	2,200 psi
Water Absorption	ASTM C413	0.2%
Slip Resistance Index	ASTM D2047	0.81 dry 0.56 wet
Impact Resistance	ASTM D4226	> 160 in. lbs
Abrasion Resistance	ASTM D4060 CS-17 1000g 1000 cycles	0.06 gm maximum weight loss
Thermal Coefficient of Linear Expansion	ASTM C531	18 x 10^{-6} in./ ^{o}F in.
Hardness Shore D	ASTM D2240	85-90
Bond Strength	ASTM D7234	>300 psi 100% concrete failure
Chemical Resistance of the following:	ASTM D1308	No Effect
Acetic acid	5 percent	
Ammonium hydroxide	10 percent	
Citric Acid	50 percent	
Fatty acid Motor Oil, 20W		
Hydrochloric acid	10 percent	
Salt water	10 percent	
Sodium Hydroxide	10 percent	
Sulfuric acid	10 percent	
Trisodium phosphate	5 percent	
Urine		
Feces		
Hydrogen peroxide	28 percent	
Distilled Water		
Sodium Hypochloride	5.28 percent	

2.2 SUPPLEMENTAL MATERIALS

A. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service or joint conditioned indicated.

B. Waterproof Membrane: Type recommended or produced by manufacturer of resinous floor coatings for type of service and conditions as specified.

2.3 CAP STRIP

A. Aluminum, Extruded: ASTM B221, Alloy 6063-T6.

B. Shape for 3/16 inch (4.76 mm) depth of base material, "J" configuration.

C. Finish:

1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.

2. Aluminum: NAAMM Amp 501:
   a. Clear anodic coating, AA-C22A41 chemically etched medium matte, with Architectural Class 1, 0.7 mils (0.018 mm) or thicker.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where monolithic resinous epoxy mortar flooring system with integral base is to be installed with the VA Resident Engineer.

B. Moisture Vapor Emission Testing: Perform moisture vapor transmission testing in accordance with ASTM F1869 to determine the MVER of the substrate prior to commencement of the work. See section 3.4, 3.

3.2 PROJECT CONDITIONS

A. Maintain temperature of rooms (air and surface) where work occurs, between 70 and 90 degrees F (21 and 32 degrees C) for at least 48 hours, before, during, and 24 hours after installation. Maintain temperature at least 70 degrees F (21 degrees C) during cure period.

B. Maintain relative humidity less than 75 percent.

C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.

D. Maintain proper ventilation of the area during application and curing time period.
   1. Comply with infection control measures of the VA Medical Center.

3.3 INSTALLATION REQUIREMENTS

A. The manufacturer's instructions for application and installation shall be reviewed with the VA Resident Engineer for the seamless resinous epoxy mortar flooring system.

B. Substrate shall be approved by manufacture technical representative.

3.4 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
   1. Prepare concrete substrates as follows:
      a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and re circulates the shot by vacuum pickup.
      b. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent. Use of acids is never allowed.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
3. Verify that concrete substrates are dry.
   a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
   b. MVT threshold for monolithic resinous Non - climatic flooring shall not exceed 5 lbs/1000 square feet (0.0001437 kPa) in a 24 hour period. MVT threshold for monolithic resinous climatic flooring shall not exceed 6 lbs/1000 square feet (0.0002155 kPa) over a 24 hour period.
   c. When MVT emission exceeds this limit, apply manufacturer’s recommended vapor control primer or other corrective measures as recommended by manufacturer prior to application of flooring or membrane systems.
   d. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 75-80 percent.
      a. Provide a written report showing test placement and results.
4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for flooring manufacturer recommended joint fill material, and concrete crack treatment.

3.5 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
   1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
   a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply Primer: over prepared substrate at manufacturer's recommended spreading rate.

C. Topcoat: Mix and roller apply the topcoat(s) with strict adherence to manufacturer's installation procedures and coverage rates.

3.6 TOLERANCE

A. From line of plane: Maximum 1/8 inch (3.18 mm) in total distance of flooring and base.

B. From radius of cove: Maximum of 1/8 inch (3.18 mm) plus or 1/16-inch (1.59 mm) minus.

3.7 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process.

B. Close area of application for a minimum of 24 hours.

C. Protect resinous flooring materials from damage and wear during construction operation.
1. Cover flooring with kraft type paper.
2. Optional 6 mm (1/4 inch) thick hardboard, plywood, or particle board where area is in foot or vehicle traffic pattern, rolling or fixed scaffolding and overhead work occurs.

D. Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

- - - E N D - - -

SECTION 09 68 00
CARPETING

PART 1 - GENERAL

1.1 DESCRIPTION

Section specifies carpet, edge strips, adhesives, and other items required for complete installation.

1.2 RELATED WORK

A. Resilient wall base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

1.3 QUALITY ASSURANCE

A. Carpet installed by mechanics certified by the Floor Covering Installation Board.

B. Certify and label the carpet that it has been tested and meets criteria of CRI IAQ Carpet Testing Program for indoor air quality.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Product Data:

1. Manufacturer’s catalog data and printed documentation stating physical characteristics, durability, resistance to fading and flame resistance characteristics for each type of carpet material and installation accessory.
2. Manufacturer’s printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
3. Manufacturer’s certificate verifying carpet containing recycled materials include percentage of recycled materials as specified.

C. Samples:

1. Carpet: "Production Quality" samples 300 x 300 mm (12 x 12 inches) of carpets, showing quality, pattern and color specified in SCHEDULE FOR FINISHES.
2. Floor Edge Strip (Molding): 150 mm (6 inches) long of each color and type specified.
3. Base Edge Strip (Molding): 150 mm (6 inches) long of each color specified.

D. Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module.

E. Maintenance Data: Carpet manufacturer’s maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

1.5 DELIVERY AND STORAGE

A. Deliver carpet in manufacturer’s original wrappings and packages clearly labeled with manufacturer’s name, brand, name, size, dye lot number and related information.

B. Deliver adhesives in containers clearly labeled with manufacturer’s name, brand name, number, installation instructions, safety instructions and flash points.

C. Store in a clean, dry, well ventilated area, protected from damage and soiling. Maintain storage space at a temperature above 16 degrees C (60 degrees F) for 2 days prior to installation.

1.6 ENVIRONMENTAL REQUIREMENTS

Areas in which carpeting is to be installed shall be maintained at a temperature above 16 degrees C (60 degrees F) for 2 days before installation, during installation and for 2 days after installation. A minimum temperature of 13 degrees C (55 degrees F) shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

1.7 WARRANTY

Carpet and installation subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is extended to two years.

1.8 APPLICABLE PUBLICATIONS

A. Publication listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American National Standards Institute (ANSI):

ANSI/NSF 140-10.....Sustainable Carpet Assessment Standard

C. American Association of Textile Chemists and Colorists (AATCC):

AATCC 16-04.....Colorfastness to Light

AATCC 129-10.....Colorfastness to Ozone in the Atmosphere under High Humidities

AATCC 134-11.....Electric Static Propensity of Carpets

AATCC 165-08.....Colorfastness to Crocking: Textile Floor Conerings-AATCC Crockmeter Method

D. American Society for Testing and Materials (ASTM):

ASTM D1335-05.....Tuft Bind of Pile Yarn Floor Coverings

ASTM D3278-96 (R2004)...Flash Point of Liquids by Small Scale Closed-Cup Apparatus

ASTM D5116-10.....Determinations of Organic Emissions from Indoor Materials/Products

ASTM D5252-05.....Operation of the Hexapod Tumble Drum Tester

ASTM D5417-05.....Operation of the Vettermann Drum Tester

ASTM E648-10.....Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

E. The Carpet and Rug Institute (CRI):

CRI 104-11.....Installation of Commercial Carpet

PART 2 - PRODUCTS

2.1 CARPET

A. Physical Characteristics:

1. Carpet free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains and other physical and manufacturing defects.
2. Manufacturers standard construction commercial carpet:
   a. Broadloom; maximum width to minimum use
   b. Modular Tile: 660 mm (24 inches) square tile.
3. Provide static control to permanently control static build upto less than 2.0 kV when tested at 20 percent relative humidity and 21 degrees C (70 degrees F) in accordance with AATCC 134.
4. Pile Height: Maximum 3.25 mm (0.10 inch).
5. Pile Fiber: Nylon with recycled content 25 percent minimum branded (federally registered trademark).
6. Pile Type: Level Loop.
7. Backing materials: Manufacturer’s unitary backing designed for glue-down installation using recovered materials.
8. Appearance Retention Rating (ARR): Carpet shall be tested and have the minimum 3.5-4.0 Severe ARR when tested in accordance with either the ASTM D 5252 (Hexapod) or ASTM D 5417 (Vettermann) test methods using the number of cycles for short and long term tests as specified.
9. Tuft Bind: Minimum force of 40 N (10 lb) required to pull a tuft or loop free from carpet backing. Test per ASTM D1335.
10. Colorfastness to Crocking: Dry and wet crocking and water bleed, comply with AATCC 165 Color Transference Chart for colors, minimum class 4 rating.
11. Colorfastness to Ozone: Comply with AATCC 129, minimum rating of 4 on the AATCC color transfer chart.
12. Delamination Strength: Minimum of 440 N/m (2.5 lb/inch) between secondary backing.

13. Flammability and Critical Radiant Flux Requirements:
    a. Test Carpet in accordance with ASTM E 648.
    b. Class I: Not less than 0.45 watts per square centimeter.
    c. Class II: Not less than 0.22 watts per square centimeter.
    d. Carpet in corridors, exits and Medical Facilities: Class I.
14. Density: Average Pile Yarn Density (APYD):
    a. Corridors, lobbies, entrances, common areas or multipurpose rooms, open offices, waiting areas and dining areas: Minimum APYD 6000.
    b. Other areas: Minimum APYD 4000.
15. VOC Limits: Use carpet and carpet adhesive that comply with the following limits for VOC content when tested according to ASTM D 5116:
    a. Carpet, Total VOCs: 0.5 mg/sq.m x hr.
    b. Carpet, 4-PC (4-Phenylcyclohexene): 0.05 mg/sq.m x hr.
    c. Carpet, Formaldehyde: 0.05 mg/sq.m x hr.
    d. Carpet, Styrene: 0.4 mg/sq.m x hr.
    e. Adhesive, Total VOCs: 10.00 mg/sq.m x hr.
    f. Adhesive, Formaldehyde: 0.05 mg/sq.m x hr.
    g. Adhesive, 2-Ethyl-1-Hexanol: 3.00 mg/sq.m x hr.

B. Shall meet platinum level of ANSI/NSF 140.

C. Color, Texture, and Pattern: As specified in SCHEDULE FOR FINISHES.

2.2 ADHESIVE AND CONCRETE PRIMER

A. Waterproof, resistant to cleaning solutions, steam and water, nonflammable, complies with air-quality standards as specified. Adhesives flashpoint minimum 60 degrees C (140 degrees F), complies with ASTM D 3278.

B. Seam Adhesives: Waterproof, non-flammable and non-staining.

2.3 SEAMING TAPE

A. Permanently resistant to carpet cleaning solutions, steam, and water.

B. Recommended by carpet manufacturer.

2.4 EDGE STRIPS (MOLDING)

A. Metal:
    1. Hammered surface aluminum, pinless, clamp down type designed for the carpet being installed.
    2. Floor flange not less than 38 mm (1-/2 inches) wide, face not less than 16 mm (5/8 inch) wide.
    3. Finish: Clear anodic coating unless specified otherwise in SCHEDULE FOR FINISHES.

B. Vinyl Edge Strip:
    1. Beveled floor flange minimum 50 mm (2 inches) wide.

2. Beveled surface to finish flush with carpet for tight joint and other side to floor finish.
3. Color as specified in SCHEDULE FOR FINISHES.

C. Carpet Base Top Edge Strip:
1. Vinyl "J" strip wall flange minimum of 38 mm (1-1/2 inches) wide with cap beveled from wall to finish flush with carpet being installed.
2. Color as specified in SCHEDULE FOR FINISHES.

2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)

A. Provide Portland cement bases polymer modifier with latex or polyvinyl acetate resin manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

B. Determine the type of underlayment selected for use by condition to be corrected.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Examine surfaces on which carpeting is to be installed.

B. Clean floor of oil, waxy films, paint, dust and deleterious substances that prevent adhesion, leave floor dry and cured, free of residue from curing or cleaning agents.

C. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.

D. Fill cracks, joints depressions, and other irregularities in concrete with leveling compound.
1. Do not use adhesive for filling or leveling purposes.
2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joint lines.

E. Test new concrete subfloor prior to adhesive application for moisture and surface alkalinity per CRI 104 Section 6.3.1 or per ASTM E1907.

3.2 CARPET INSTALLTION

A. Do not install carpet until work of other trades including painting is complete and dry.

B. Install in accordance with CRI 104 direct glue down installation.
1. Relax carpet in accordance with Section 6.4.
2. Comply with indoor air quality recommendations noted in Section 6.5.
3. Maintain temperature in accordance with Section 15.3.

C. Secure carpet to subfloor of spaces with adhesive applied as recommended by carpet manufacturer.

D. Follow carpet manufacturer's recommendations for matching pattern and texture directions.
E. Cut openings in carpet where required for installing equipment, pipes, outlets, and penetrations.
   1. Bind or seal cut edge of sheet carpet and replace flanges or plates.
   2. Use additional adhesive to secure carpets around pipes and other vertical projections.
F. Broadloom Carpet:
   1. Install per CRI 104, Section 8.
   2. Lay broadloom carpet lengthwise in longest dimension of space, with minimum seams, uniformly spaced to provide a tight smooth finish, free from movement when subjected to traffic.
   3. Use tape-seaming method to join sheet carpet edges. Do not leave visible seams.
G. Carpet Modules:
   1. Install per CRI 104, Section 13, Adhesive Application.
   2. Lay carpet modules with pile in same direction unless specified other wise.
   3. Install carpet modules so that cleaning methods and solutions do not cause dislocation of modules.
   4. Lay carpet modules uniformly to provide tight flush joints free from movement when subject to traffic.

3.3 EDGE STRIPS INSTALLATION

A. Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.
B. Anchor metal strips to floor with suitable fasteners. Apply adhesive to edge strips, insert carpet into lip and press it down over carpet.
C. Anchor vinyl edge strip to floor with adhesive apply adhesive to edge strip and insert carpet into lip and press lip down over carpet.

3.4 PROTECTION AND CLEANING

A. Remove waste, fasteners and other cuttings from carpet floors.
B. Vacuum carpet and provide suitable protection. Do not use polyethylene film.
C. Do not permit traffic on carpeted surfaces for at least 48 hours after installation. Protect the carpet in accordance with CRI 104.
D. Do not move furniture or equipment on unprotected carpeted surfaces.
E. Just before final acceptance of work, remove protection and vacuum carpet clean.

- - - E N D - - -

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of exterior fixtures, poles, and supports. The terms “lighting fixtures”, “fixture” and “luminaire” are used interchangeably.

1.2 RELATED WORK

A. Section 03 30 00, CAST-IN-PLACE CONCRETE.

B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.

C. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Low voltage power and lighting wiring.

D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

E. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.

F. Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION: Underground handholes and conduits.

G. Section 26 09 23, LIGHTING CONTROLS: Controls for exterior lighting.

1.3 QUALITY ASSURANCE

A. Refer to Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES), in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:

a. Submit the following information for each type of lighting fixture designated on the LIGHTING FIXTURE SCHEDULE, arranged in order of lighting fixture designation.

b. Material and construction details, include information on housing and optics system.

c. Physical dimensions and description.

d. Wiring schematic and connection diagram.

e. Installation details.

f. Energy efficiency data.

g. Photometric data based on laboratory tests complying with IES Lighting Measurements testing and calculation guides.

h. Lamp data including lumen output (initial and mean), color rendition index (CRI), rated life (hours), and color temperature (degrees Kelvin).

i. Ballast data including ballast type, starting method, ambient temperature, ballast factor, sound rating, system watts, and total harmonic distortion (THD).

j. For LED lighting fixtures, submit US DOE LED Lighting Facts label, and IES L70 rated life.

k. Submit site plan showing all exterior lighting fixtures with fixture tags consistent with Lighting Fixture Schedule as shown on drawings. Site plan shall show computer generated point–by-point illumination calculations. Include lamp lumen and light loss factors used in calculations.

2. Manuals:

a. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals, including technical data sheets, wiring diagrams, and information for ordering replacement parts.

b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

3. Certifications: Two weeks prior to final inspection, submit the following.

a. Certification by the Contractor that the exterior lighting systems have been properly installed and tested.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. Aluminum Association Inc. (AA):

AAH35.1-06.....Alloy and Temper Designation Systems for Aluminum

C. American Association of State Highway and Transportation Officials (AASHTO):

LTS-5-09 .....Structural Supports for Highway Signs, Luminaires and Traffic Signals

D. American Concrete Institute (ACI):

318-05 .....Building Code Requirements for Structural Concrete

E. American National Standards Institute (ANSI):

C81.61-09 .....Electrical Lamp Bases – Specifications for Bases (Caps) for Electric Lamps

F. American Society for Testing and Materials (ASTM):

A123/A123M-09 .....Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

A153/A153M-09.....Zinc Coating (Hot-Dip) on Iron and Steel Hardware

B108-03a-08 .....Aluminum-Alloy Permanent Mold Castings

C1089-06 .....Spun Cast Prestressed Concrete Poles

G. Federal Aviation Administration (FAA):

AC 70/7460-IK-07.....Obstruction Lighting and Marking

AC 150/5345-43F-06.....Obstruction Lighting Equipment

H. Illuminating Engineering Society of North America (IESNA)

HB-9-00.....Lighting Handbook

RP-8-05.....Roadway Lighting

RP-20-98.....Lighting for Parking Facilities

RP-33-99.....Lighting for Exterior Environments

LM-5-96.....Photometric Measurements of Area and Sports Lighting Installations

LM-50-99.....Photometric Measurements of Roadway Lighting Installations

LM-52-99.....Photometric Measurements of Roadway Sign Installations

LM-64-01.....Photometric Measurements of Parking Areas

LM-72-97.....Directional Positioning of Photometric Data

LM-79-08.....Approved Method for the Electrical and Photometric Measurements of Solid-Sate Lighting Products

LM-80-08.....Approved Method for Measuring Lumen Maintenance of LED Light Sources

I. National Electrical Manufacturers Association (NEMA):

C78.41-06.....Electric Lamps – Guidelines for Low-Pressure Sodium Lamps

C78.42-07 .....Electric Lamps – Guidelines for High-Pressure Sodium Lamps

C78.43-07 .....Electric Lamps – Single-Ended Metal-Halide Lamps

C78.1381-98.....Electric Lamps – 70-Watt M85 Double-Ended Metal-Halide Lamps

C82.4-02 .....Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)

C136.3-05 .....For Roadway and Area Lighting Equipment – Luminaire Attachments

C136.17-05 .....Roadway and Area Lighting Equipment – Enclosed Side-Mounted Luminaires for Horizontal-Burning High-Intensity-Discharge Lamps – Mechanical Interchangeability of Refractors

ICS 2-00 (R2005) .....Controllers, Contactors and Overload Relays Rated 600 Volts

ICS 6-93 (R2006) .....Enclosures

J. National Fire Protection Association (NFPA):

70-08 .....National Electrical Code (NEC)

K. Underwriters Laboratories, Inc. (UL):

496-08 .....Lampholders

773-95.....Plug-In, Locking Type Photocontrols for Use with Area Lighting

773A-06 .....Nonindustrial Photoelectric Switches for Lighting Control

1029-94.....High-Intensity-Discharge Lamp Ballasts

1598-08 .....Luminaires

8750-08.....Light Emitting Diode (LED) Light Sources for Use in Lighting Products

1.6 DELIVERY, STORAGE, AND HANDLING

Provide manufacturer’s standard provisions for protecting pole finishes during transport, storage, and installation. Do not store poles on

ground. Store poles so they are at least 12 in [305 mm] above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

Luminaires, materials and equipment shall be in accordance with NEC, UL, ANSI, and as shown on the drawings and specified.

2.2 LUMINAIRES

A. Luminaires shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat, and safe cleaning and relamping.

B. Illumination distribution patterns, BUG ratings and cutoff types as defined by the IESNA shall be as shown on the drawings.

C. Incorporate ballasts in the luminaire housing, except where otherwise shown on the drawings.

D. Lenses shall be frame-mounted, heat-resistant, borosilicate glass, with prismatic refractors, unless otherwise shown on the drawings. Attach the frame to the luminaire housing by hinges or chain. Use heat and aging-resistant, resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

E. Lamp sockets for high intensity discharge (H.I.D) fixture shall have locking-type porcelain enclosures in conformance to the applicable requirements of ANSI C81.61-09 and UL 496-08.

F. Pre-wire internal components to terminal strips at the factory.

G. Bracket-mounted luminaires shall have leveling provisions and clamp-type adjustable slip-fitters with locking screws.

H. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.

I. Provide manufacturer's standard finish, as scheduled on the drawings. Where indicated on drawings, match finish process and color of pole or support materials. Where indicated on drawings, provide finishes as indicated.

J. Luminaires shall carry factory labels, showing complete, specific lamp and ballast information.

2.3 LAMPS

A. Install the proper lamps in every luminaire installed and every existing luminaire relocated or reinstalled as shown on the drawings.

B. Lamps shall be general-service, outdoor lighting types.

C. High-Pressure Sodium (HPS) Lamps: Comply with NEMA C78.42, Color Rendering Index (CRI) 21 (minimum), wattage as indicated on fixture schedule. Lamps shall have minimum average rated life of 24,000 hours.

D. Low-Pressure Sodium (LPS) Lamps: Comply with NEMA C78.43, wattage as indicated on fixture schedule. Lamps shall have minimum average rated life of 18,000 hours.

E. Metal-Halide Lamps: Comply with NEMA C78.43 or NEMA C78.1381. Lamps shall be pulse start or ceramic type with wattage and correlated color temperature as indicated on fixture schedule.

F. LED sources shall meet the following requirements:

1. Operating temperature rating shall be between -40 degrees C (-40 degrees F) and 50 degrees C (120 degrees F).
2. Correlated Color Temperature (CCT): 3000K.
3. Color Rendering Index (CRI): ≥ 85.
4. The manufacturer shall have performed reliability tests on the LEDs luminaires complying with Illuminating Engineering Society (IES) LM79 for photometric performance and LM80 for lumen maintenance and L70 life.

G. Mercury vapor lamps shall not be used.

2.7 LED DRIVERS

A. LED drivers shall meet the following requirements:

1. Drivers shall have a minimum efficiency of 85%.
2. Starting Temperature: -40˚ F [-40˚ C].
3. Input Voltage: 120 to 480 (±10%) V.
4. Power Supplies: Class I or II output.
5. Surge Protection: The system must survive 250 repetitive strikes of “C Low” (C Low: 6kV/1.2 x 50 μs, 10kA/8 x 20 μs) waveforms at 1-minute intervals with less than 10% degradation in clamping voltage. “C Low” waveforms are as defined in IEEE/ASNI C62.41.2-2002, Scenario 1 Location Category C.
6. Power Factor (PF): ≥ 0.90.
7. Total Harmonic Distortion (THD): ≤ 20%.
8. Comply with FCC Title 47 CFR Part 18 Non-consumer RFI/EMI Standards.
9. Drivers shall be reduction of hazardous substances (ROHS)-compliant.

2.8 EXISTING LIGHTING SYSTEMS

A. For modifications or additions to existing lighting systems, the new components shall be compatible with the existing systems.

B. New poles and luminaires shall have approximately the same configurations and dimensions as the existing poles and luminaires, except where otherwise shown on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lighting in accordance with the NEC, as shown on the drawings, and in accordance with manufacturer’s recommendations.

B. Pole Foundations:

1. Excavate only as necessary to provide sufficient working clearance for installation of forms and proper use of tamper to the full depth of the excavation. Prevent surface water from flowing into the excavation. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath, and the end of conduit.
2. Set anchor bolts according to anchor-bolt templates furnished by the pole manufacturer.
3. Install poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
4. After the poles have been installed, shimmed, and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 0.375 in [9 mm] inside diameter through the grout, tight to the top of the concrete base to prevent moisture weeping from the interior of the pole.

C. Install lamps in each luminaire.

D. Adjust luminaires that require field adjustment or aiming.

3.2 GROUNDING

Ground noncurrent-carrying parts of equipment, including metal poles, luminaires, mounting arms, brackets, and metallic enclosures, as specified in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially-treated or lined connectors suitable and listed for this purpose.

3.3 ACCEPTANCE CHECKS AND TESTS

Verify operation after installing luminaires and energizing circuits.

- - - E N D - - -

SECTION 32 05 23
CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section shall cover site work concrete constructed upon the prepared subgrade and in conformance with the lines, grades, thickness, and cross sections shown. Construction shall include the following:

B. Curb, gutter, and combination curb and gutter wheel stop.

C. Pedestrian Pavement: Walks grade slabs lawn mower strips crossings wheelchair curb ramps terraces steps.

D. Vehicular Pavement: Service courts driveways.

E. Equipment Pads: transformers

1.2 RELATED WORK

A. Laboratory and Field Testing Requirements: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Subgrade Preparation: Section 31 20 00, EARTH MOVING.

C. Concrete Materials, Quality, Mixing, Design and Other Requirements: Section 03 30 00, CAST-IN-PLACE-CONCRETE.

D. Metal Components of Steps (Nosing and Railing): Section 05 50 00, METAL FABRICATIONS.

1.3 DESIGN REQUIREMENTS

Design all elements with the latest published version of applicable codes.

1.4 WEATHER LIMITATIONS

Placement of concrete shall be as specified under Article 3.8, COLD WEATHER and Article 3.7, HOT WEATHER of Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.5 SELECT SUBBASE MATERIAL JOB-MIX

The Contractor shall retain and reimburse a testing laboratory to design a select subbase material mixture and submit a job-mix formula to the Resident Engineer, in writing, for approval. The formula shall include the source of materials, gradation, plasticity index, liquid limit, and laboratory compaction curves indicating maximum density at optimum moisture.

1.6 SUBMITTALS

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:

B. Manufacturers' Certificates and Data certifying that the following materials conform to the requirements specified.
   1. Expansion joint filler
   2. Hot poured sealing compound
   3. Reinforcement
   4. Curing materials

C. Data and Test Reports: Select subbase material.
   1. Job-mix formula.
   2. Source, gradation, liquid limit, plasticity index, percentage of wear, and other tests as specified and in referenced publications.

1.7 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Refer to the latest edition of all referenced Standards and codes.

B. American Association of State Highway and Transportation Officials (AASHTO):

M031MM031-07-UL.....Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement (ASTM A615/A615M-09)

M055MM055-09-UL.....Steel Welded Wire Reinforcement, Plain, for Concrete (ASTM A185)

M147-65-UL.....Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses (R 2004)

M148-05-UL.....Liquid Membrane-Forming Compounds for Curing Concrete (ASTM C309)

M171-05-UL.....Sheet Materials for Curing Concrete (ASTM C171)

M182-05-UL.....Burlap Cloth Made from Jute or Kenaf and Cotton Mats

M213-01-UL.....Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Type) (ASTM D1751)

M233-86-UL.....Boiled Linseed Oil Mixer for Treatment of Portland Cement Concrete

T099-09-UL.....Moisture-Density Relations of Soils Using a 2.5 kg. (5.5 lb) Rammer and a 305 mm (12 in.) Drop

T180-09-UL.....Moisture-Density Relations of Soils Using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop

C. American Society for Testing and Materials (ASTM):

C94/C94M-09.....Ready-Mixed Concrete
C143/C143M-09.....Slump of Hydraulic Cement Concrete

PART 2 - PRODUCTS

2.1 GENERAL

Concrete shall be Type C, air-entrained as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE, with the following exceptions:

TYPE	MAXIMUM SLUMP*
Curb & Gutter	75 mm (3")
Pedestrian Pavement	75 mm (3")
Vehicular Pavement	50 mm (2") (Machine Finished) 100 mm (4") (Hand Finished)
Equipment Pad	75 to 100 mm (3" to 4")
* For concrete to be vibrated: Slump as determined by ASTM C143. Tolerances as established by ASTM C94.	

2.2 REINFORCEMENT

A. The type, amount, and locations of steel reinforcement shall be as shown on the drawings and in the specifications.
B. Welded wire-fabric shall conform to AASHTO M55.
C. Dowels shall be plain steel bars conforming to AASHTO M31. Tie bars shall be deformed steel bars conforming to AASHTO M31.

2.3 SELECT SUBBASE (WHERE REQUIRED)

A. Subbase material shall consist of select granular material composed of sand, sand-gravel, crushed stone, crushed or granulated slag, with or without soil binder, or combinations of these materials conforming to AASHTO M147, Grading E or F.
B. Materials meeting other gradations than that noted will be acceptable whenever the gradations are within a tolerance of three to five percent, plus or minus, of the single gradation established by the job-mix formula.
C. Subbase material shall produce a compacted, dense-graded course, meeting the density requirement specified herein.

2.4 FORMS

A. Use metal or wood forms that are straight and suitable in cross-section, depth, and strength to resist springing during depositing and consolidating the concrete, for the work involved.

B. Do not use forms if they vary from a straight line more than 3 mm (1/8 inch) in any 3000 mm (ten foot) long section, in either a horizontal or vertical direction.

C. Wood forms should be at least 50 mm (2 inches) thick (nominal). Wood forms shall also be free from warp, twist, loose knots, splits, or other defects. Use approved flexible or curved forms for forming radii.

2.5 CONCRETE CURING MATERIALS

A. Concrete curing materials shall conform to one of the following:

1. Burlap conforming to AASHTO M182 having a weight of 233 grams (seven ounces) or more per square meter (yard) when dry.
2. Impervious Sheeting conforming to AASHTO M171.
3. Liquid Membrane Curing Compound conforming to AASHTO M148 (ASTM C309), Type 1 Type 2 and shall be free of paraffin or petroleum.

2.6 EXPANSION JOINT FILLERS

Material shall conform to AASHTO M213.

PART 3 - EXECUTION

3.1 SUBGRADE PENETRATION

A. Prepare, construct, and finish the subgrade as specified in Section 31 20 00, EARTH MOVING.

B. Maintain the subgrade in a smooth, compacted condition, in conformance with the required section and established grade until the succeeding operation has been accomplished.

3.2 SETTING FORMS

A. Base Support:

1. Compact the base material under the forms true to grade so that, when set, they will be uniformly supported for their entire length at the grade as shown.
2. Correct imperfections or variations in the base material grade by cutting or filling and compacting.

B. Form Setting:

1. Set forms sufficiently in advance of the placing of the concrete to permit the performance and approval of all operations required with and adjacent to the form lines.
2. Set forms to true line and grade and use stakes, clamps, spreaders, and braces to hold them rigidly in place so that the forms and joints are free from play or movement in any direction.
3. Forms shall conform to line and grade with an allowable tolerance of 3 mm (1/8 inch) when checked with a straightedge and shall not deviate from true line by more than 6 mm (1/4 inch) at any point.

4. Do not remove forms until removal will not result in damaged concrete or at such time to facilitate finishing.
5. Clean and oil forms each time they are used.

C. The Contractor’s Registered Professional Land Surveyor, specified in Section 00 72 00, GENERAL CONDITIONS, shall establish and control the alignment and the grade elevations of the forms or concrete slipforming machine operations.
1. Make necessary corrections to forms immediately before placing concrete.
2. When any form has been disturbed or any subgrade or subbase has become unstable, reset and recheck the form before placing concrete.

3.3 EQUIPMENT

A. The Resident Engineer shall approve equipment and tools necessary for handling materials and performing all parts of the work prior to commencement of work.

B. Maintain equipment and tools in satisfactory working condition at all times.

3.4 PLACING REINFORCEMENT

A. Reinforcement shall be free from dirt, oil, rust, scale or other substances that prevent the bonding of the concrete to the reinforcement.

B. Before the concrete is placed, the Resident Engineer shall approve the reinforcement, which shall be accurately and securely fastened in place with suitable supports and ties. The type, amount, and position of the reinforcement shall be as shown.

3.5 PLACING CONCRETE - GENERAL

A. Obtain approval of the Resident Engineer before placing concrete.

B. Remove debris and other foreign material from between the forms before placing concrete. Obtain approval of the Resident Engineer before placing concrete.

C. Before the concrete is placed, uniformly moisten the subgrade, base, or subbase appropriately, avoiding puddles of water.

D. Convey concrete from mixer to final place of deposit by a method which will prevent segregation or loss of ingredients. Deposit concrete so that it requires as little handling as possible.

E. While being placed, spade or vibrate and compact the concrete with suitable tools to prevent the formation of voids or honeycomb pockets. Vibrate concrete well against forms and along joints. Over-vibration or manipulation causing segregation will not be permitted. Place concrete continuously between joints without bulkheads.

F. Install a construction joint whenever the placing of concrete is suspended for more than 30 minutes and at the end of each day's work.

G. Workmen or construction equipment coated with foreign material shall not be permitted to walk or operate in the concrete during placement and finishing operations.

3.6 PLACING CONCRETE FOR CURB AND GUTTER, PEDESTRIAN PAVEMENT, AND EQUIPMENT PADS

A. Place concrete in the forms in one layer of such thickness that, when compacted and finished, it will conform to the cross section as shown.

B. Deposit concrete as near to joints as possible without disturbing them but do not dump onto a joint assembly.

C. After the concrete has been placed in the forms, use a strike-off guided by the side forms to bring the surface to the proper section to be compacted.

D. Consolidate the concrete thoroughly by tamping and spading, or with approved mechanical finishing equipment.

E. Finish the surface to grade with a wood or metal float.

F. All Concrete pads and pavements shall be constructed with sufficient slope to drain properly.

3.7 PLACING CONCRETE FOR VEHICULAR PAVEMENT

A. Deposit concrete into the forms as close as possible to its final position.

B. Place concrete rapidly and continuously between construction joints.

C. Strike off concrete and thoroughly consolidate by a finishing machine, vibrating screed, or by hand-finishing.

D. Finish the surface to the elevation and crown as shown.

E. Deposit concrete as near the joints as possible without disturbing them but do not dump onto a joint assembly. Do not place adjacent lanes without approval by the Resident Engineer.

3.8 CONCRETE FINISHING - GENERAL

A. The sequence of operations, unless otherwise indicated, shall be as follows:

1. Consolidating, floating, straight-edging, troweling, texturing, and edging of joints.
2. Maintain finishing equipment and tools in a clean and approved condition.

3.9 CONCRETE FINISHING CURB AND GUTTER

A. Round the edges of the gutter and top of the curb with an edging tool to a radius of 6mm (1/4 inch) or as otherwise detailed.

B. Float the surfaces and finish with a smooth wood or metal float until true to grade and section and uniform in textures.

C. Finish the surfaces, while still wet, with a bristle type brush with longitudinal strokes.

D. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the surface, while still wet, in the same manner as the gutter and curb top.

E. Except at grade changes or curves, finished surfaces shall not vary more than 3 mm (1/8 inch) for gutter and 6 mm (1/4 inch) for top and face of curb, when tested with a 3000 mm (10 foot) straightedge.

F. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints.

G. Correct any depressions which will not drain.

H. Visible surfaces and edges of finished curb, gutter, and combination curb and gutter shall be free of blemishes, form marks, and tool marks, and shall be uniform in color, shape, and appearance.

3.11 CONCRETE FINISHING PEDESTRIAN PAVEMENT

A. Walks, Grade Slabs, Lawn Mower Crossings, Wheelchair Curb Ramps, Terraces:

1. Finish the surfaces to grade and cross section with a metal float, trowled smooth and finished with a broom moistened with clear water.
2. Brooming shall be transverse to the line of traffic.
3. Finish all slab edges, including those at formed joints, carefully with an edger having a radius as shown on the Drawings.
4. Unless otherwise indicated, edge the transverse joints before brooming. The brooming shall eliminate the flat surface left by the surface face of the edger. Execute the brooming so that the corrugation, thus produced, will be uniform in appearance and not more than 2 mm (1/16 inch) in depth.
5. The completed surface shall be uniform in color and free of surface blemishes, form marks, and tool marks. The finished surface of the pavement shall not vary more than 5 mm (3/16 inch) when tested with a 3000 mm (10 foot) straightedge.
6. The thickness of the pavement shall not vary more than 6 mm (1/4 inch).
7. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints.

B. Steps: The method of finishing the steps and the sidewalls is similar to above except as herein noted.

1. Remove the riser forms one at a time, starting with the top riser.
2. After removing the riser form, rub the face of the riser with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Use an outside edger to round the corner of the tread; use an inside edger to finish the corner at the bottom of the riser.
3. Give the risers and sidewall a final brush finish. The treads shall have a final finish with a stiff brush to provide a non-slip surface.
4. The texture of the completed steps shall present a neat and uniform appearance and shall not deviate from a straightedge test more than 5 mm (3/16 inch).

3.12 CONCRETE FINISHING FOR VEHICULAR PAVEMENT

A. Accomplish longitudinal floating with a longitudinal float not less than 3000 mm (10 feet) long and 150 mm (6 inches) wide, properly stiffened to prevent flexing and warping. Operate the float from foot bridges in a sawing motion parallel to the direction in which the pavement is being laid from one side of the pavement to the other, and advancing not more than half the length of the float.

B. After the longitudinal floating is completed, but while the concrete is still plastic, eliminate minor irregularities in the pavement surfaces by means of metal floats, 1500 mm (5 feet) in length, and straightedges, 3000 mm (10 feet) in length. Make the final finish with the straightedges, which shall be used to float the entire pavement surface.

C. Test the surface for trueness with a 3000 mm (10 foot) straightedge held in successive positions parallel and at right angles to the direction in which the pavement is being laid and the entire area covered as necessary to detect variations. Advance the straightedge along the pavement in successive stages of not more than one half the length of the straightedge. Correct all irregularities and refinish the surface.

D. The finished surface of the pavement shall not vary more than 6 mm (1/4 inch) in both longitudinal and transverse directions when tested with a 3000 mm (10 foot) straightedge.

E. The thickness of the pavement shall not vary more than 6 mm (1/4 inch).

F. When most of the water glaze or sheen has disappeared and before the concrete becomes nonplastic, give the surface of the pavement a broomed finish with an approved fiber broom not less than 450 mm (18 inches) wide. Pull the broom gently over the surface of the pavement from edge to edge. Brooming shall be transverse to the line of traffic and so executed that the corrugations thus produced will be uniform in character and width, and not more than 3 mm (1/8 inch) in depth.

Carefully finish the edge of the pavement along forms and at the joints with an edging tool. The brooming shall eliminate the flat surface left by the surface face of the edger.

G. The finish surfaces of new and existing abutting pavements shall coincide at their juncture.

3.13 CONCRETE FINISHING EQUIPMENT PADS

A. After the surface has been struck off and screeded to the proper elevation, give it a smooth dense float finish, free from depressions or irregularities.

B. Carefully finish all slab edges with an edger having a radius as shown in the Drawings.

C. After removing the forms, rub the faces of the pad with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The finish surface of the pad shall not vary more than 3 mm (1/8 inch) when tested with a 3000 mm (10 foot) straightedge.

D. Correct irregularities exceeding the above.

3.14 JOINTS - GENERAL

A. Place joints, where shown, conforming to the details as shown, and perpendicular to the finished grade of the concrete surface.

B. Joints shall be straight and continuous from edge to edge of the pavement.

3.15 CONTRACTION JOINTS

A. Cut joints to depth as shown with a grooving tool or jointer of a radius as shown or by sawing with a blade producing the required width and depth.

B. Construct joints in curbs and gutters by inserting 3 mm (1/8 inch) steel plates conforming to the cross sections of the curb and gutter.

C. Plates shall remain in place until concrete has set sufficiently to hold its shape and shall then be removed.

D. Finish edges of all joints with an edging tool having the radius as shown.

E. Score pedestrian pavement with a standard grooving tool or jointer.

3.16 EXPANSION JOINTS

A. Use a preformed expansion joint filler material of the thickness as shown to form expansion joints.

B. Material shall extend the full depth of concrete, cut and shaped to the cross section as shown, except that top edges of joint filler shall be below the finished concrete surface where shown to allow for sealing.

C. Anchor with approved devices to prevent displacing during placing and finishing operations.

D. Round the edges of joints with an edging tool.

E. Form expansion joints as follows:

1. Without dowels, about structures and features that project through, into, or against any site work concrete construction.
2. Using joint filler of the type, thickness, and width as shown.
3. Installed in such a manner as to form a complete, uniform separation between the structure and the site work concrete item.

3.17 CONSTRUCTION JOINTS

A. Locate longitudinal and transverse construction joints between slabs of vehicular pavement as shown.

B. Place transverse construction joints of the type shown, where indicated and whenever the placing of concrete is suspended for more than 30 minutes.

C. Use a butt-type joint with dowels in curb and gutter if the joint occurs at the location of a planned joint.

D. Use keyed joints with tiebars if the joint occurs in the middle third of the normal curb and gutter joint interval.

3.18 FORM REMOVAL

A. Forms shall remain in place at least 12 hours after the concrete has been placed. Remove forms without injuring the concrete.

B. Do not use bars or heavy tools against the concrete in removing the forms. Promptly repair any concrete found defective after form removal.

3.20 CURING OF CONCRETE

A. Cure concrete by one of the following methods appropriate to the weather conditions and local construction practices, against loss of moisture, and rapid temperature changes for at least seven days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready to install before actual concrete placement begins. Provide protection as necessary to prevent cracking of the pavement due to temperature changes during the curing period. If any selected method of curing does not afford the proper curing and protection against concrete cracking, remove and replace the damaged pavement and employ another method of curing as directed by the Resident Engineer.

B. Burlap Mat: Provide a minimum of two layers kept saturated with water for the curing period. Mats shall overlap each other at least 150 mm (6 inches).

C. Impervious Sheeting: Use waterproof paper, polyethylene-coated burlap, or polyethylene sheeting. Polyethylene shall be at lease 0.1 mm (4 mils) in thickness. Wet the entire exposed concrete surface with a fine spray of water and then cover with the sheeting material. Sheets shall overlap each other at least 300 mm (12 inches). Securely anchor sheeting.

D. Liquid Membrane Curing:

1. Apply pigmented membrane-forming curing compound in two coats at right angles to each other at a rate of 5 m^2/L (200 square feet per gallon) for both coats.
2. Do not allow the concrete to dry before the application of the membrane.
3. Cure joints designated to be sealed by inserting moistened paper or fiber rope or covering with waterproof paper prior to application of the curing compound, in a manner to prevent the curing compound entering the joint.
4. Immediately re-spray any area covered with curing compound and damaged during the curing period.

3.21 CLEANING

A. After completion of the curing period:

1. Remove the curing material (other than liquid membrane).
2. Sweep the concrete clean.
3. After removal of all foreign matter from the joints, seal joints as herein specified.
4. Clean the entire concrete of all debris and construction equipment as soon as curing and sealing of joints has been completed.

3.22 PROTECTION

The contractor shall protect the concrete against all damage prior to final acceptance by the Government. Remove concrete containing excessive cracking, fractures, spalling, or other defects and reconstruct the entire section between regularly scheduled joints, when directed by the Resident Engineer, and at no additional cost to the Government. Exclude traffic from vehicular pavement until the concrete is at least seven days old, or for a longer period of time if so directed by the Resident Engineer.

3.23 FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the Station.

- - - E N D - - -

TECHNICAL NOTES

A. These Technical Notes are intended as a guide in preparing this specification section and the detail drawings. Delete these notes before typing the Contract Specifications. Modify this specification section and appropriate details and finishes included on the drawings for site work concrete, such as, other methods of construction (when aesthetics is of prime importance), or special game areas (shuffleboard, horseshoe, game tables, etc.). If any of the following items are used, include the referenced publication and paragraphs in the appropriate portion of the contract specification.

1. When the project is located in an area where winter damage from deicing chemicals and freeze-thaw cycles pose a serious problem, the Spec Writer shall check the need for a special protective coating of linseed oil mixture. The coating protects only against the action of urea, sodium chloride, and calcium chloride used for deicing purposes. Protection against these chemicals is not required for concrete that will be in place for a cumulative time of six weeks at a continuous minimum temperature of 5 °C (40 °F), excluding the curing time. Otherwise, give concrete protective coating. Referenced paragraphs:

   APPLICABLE PUBLICATION: AASHTO M233. Boiled Linseed Oil Mixture for Treatment of Portland Cement Concrete.

   MATERIALS: Concrete Protection Material-Linseed Oil mixture shall conform to AASHTO M233.

   CURING AND PROTECTION: Protective Coating - apply protective coating of linseed oil mixture to exposed-to-view concrete surfaces, drainage structures, and features that project through, into, or against the items constructed under this section to protect the concrete against the action of deicing materials.

   a. Application: Complete backfilling and curing operation prior to applying protective coating. Concrete shall be surface dry and thoroughly clean before each application. Give the concrete surface at least two applications. Coverage shall not be more than 11 m2/L (50 square yards per gallon) for first application, and not more than 16 m2/L (70 square yards per gallon) for the second application, except when the number of applications and coverage for each application for commercially prepared mixture shall be in accordance with the manufacturer's instructions. Protect coated surfaces from vehicular and pedestrian traffic until dry.

b. Precautions: Do not heat protective coating, and do not expose the protective coating to open flame, sparks, or fire adjacent to open containers or applicators. Do not apply material at temperatures lower than 10 ?C (50 ?F).

SUBMITTALS: Certificates-Concrete Protective Coating.

2. In some case it may be practical and economical to build concrete vehicular pavement with an integral curb section. The integral curb being constructed simultaneously with the pavement slab in a one-step operation avoids a longitudinal joint between the curb and gutter, and pavement. The curb is easily formed with a template and straightedge. The only joints generally required in the integral curbs are continuations of the transverse joints in the pavement slab. Another option for concrete curb or curb and gutter not required to be constructed integral with or tied to a concrete pavement, is the use of a self-propelled machine (slipforming machine) to place the concrete. This type of construction is most advantageous when the drawing details indicate a "mountable" (rolled) type curb and gutter. However, use of these machines on small jobs is generally not cost justifiable. Include the following paragraph and additional requirements for the integral curb template, extrusion equipment, and self-propelled machine in the appropriate portions of the Contract Specification, when an integral curb is indicated on the drawings or the use of a curb-forming machine is justified.

   CURB-FORMING MACHINES: Curb-forming machines for constructing integral curbs and gutters will be approved based on trail use on the job. If the equipment produces unsatisfactory results, discontinue use of the equipment at any time during construction and accomplish the work by hand method construction as specified. Remove unsatisfactory work and reconstruct the full length between regularly scheduled joints. Dispose of removed portions off the Station.

3. When aesthetics is of prime importance and certain areas are shown to have a special finish and texture, such as an exposed aggregate surface or to have colored concrete, the Spec Writer shall consider the use of the following data:

   a. Contact the Portland Cement Association district office in the area of the project for advice in specifying and detailing the finish and texture desired.

   b. Exposed Aggregate Concrete: For use by the physically handicapped, the texture of an exposed aggregate surface shall be smooth and the aggregate size shall not produce a rough finish. There are a

number of ways to obtain exposed aggregate finishes, so base the method selected on local materials and construction practices. The following is a suggested paragraph:

EXPOSED AGGREGATE CONCRETE: When concrete is shown to have an exposed aggregate surface, the finish shall be as follows: Apply mix and mark off surface as indicated with surface joints at least 10 mm (3/8 inch) deep. Level off finish to a true surface and compact with a wood float, working as little as possible so that coarse material will remain at the top. Before finish has set, treat top surface with cement retarding material. When body of concrete finish has set, remove retarded surface film by wire brushes and fine water spray to remove the mortar from the top of the colored aggregate. Continue washing and brushing until flush water runs clear and there is no noticeable cement film left on the aggregate. Prior to starting work, submit a sample of exposed aggregate concrete panel to the Resident Engineer for approval.

Edit the above paragraph to describe the "seeding method" of preparing a concrete base 10 to 13 mm (3/8 to 1/2-inch) lower than the finish grade to accommodate the aggregate to be scattered over the concrete base surface and embedded therein by use of a hand float, straight edge, or darby. After the aggregate is embedded, the usual procedures are followed to expose the aggregate.

B. Colored Concrete - Two method of producing colored concrete finishes are: By integral color or by the dry-shake method. For durability, uniformity of color and lower cost, the Department of Veterans Affairs preference is the integral color method. The amount of pigment used to achieve integral colored concrete should be the minimum amount necessary to produce the desired color, but never more than 10 percent by weight of the cement. The use of white Portland cement produces cleaner, brighter colors and is the preference to normal gray Portland cement, except for black or dark gray colors. The following is a suggested paragraph:

COLORED CONCRETE: Pedestrian pavement designed to be colored shall have the coloring introduced into the concrete mix at the batch plant. Prior to starting work, submit a sample of the colored concrete with type of coloring additive and the amount of additive per m3 (cubic yard) of concrete mix to the Resident Engineer for approval.

Some coloring materials affect air entrainment while others do not, the Spec Writer will make certain that the color and mixtures used do not produce a concrete having less than the desired air content specified in

Section 03 30 00, CAST-IN-PLACE CONCRETE. Edit the above paragraph and drawing details as required to cover mixing, placing, preparation, equipment, finish, and any special construction.

C. Include under the SUBMITTALS portion of Contract Specifications the following paragraphs(s) as applicable:

Samples:

1. Exposed aggregate concrete panel, 0.4 m2 by 50 mm (4 square feet by 2 inches) thick, 2 required, each color and finish.
2. Snow Melting Systems - Specify snow melting systems as required by the HVAC design manual in a separate section and that section title referenced in this section. The site plan drawings shall indicate the areas to be provided with the snow melting systems.

- - - E N D - - -

SECTION 32 14 16
BRICK UNIT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

The requirements for brick pavers, set in mortar on a rigid base, are specified in this section.

1.2 RELATED WORK

A. Concrete Substrate: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

B. See drawings for the paving pattern.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:

1. Five individual samples of brick showing extreme variations in color and texture.
2. Two bar samples of colored mortar.

C. Test Samples: Five random bricks taken from the work site by the Resident Engineer for testing, to verify brick meets ASTM C67 freeze thaw tests specified.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.

B. Store masonry materials under waterproof covers on planking clear of ground, and protect from handling damage, dirt, stain, water and wind.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

C144-04.....Aggregate for Masonry Mortar
C150-07.....Portland Cement
C270-08.....Mortar for Unit Masonry
C902-09.....Pedestrian and Light Traffic Paving Brick

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paving Brick: ASTM C902; Class SX, Type I.

B. Sand: ASTM C144.

C. Portland Cement: ASTM C150.

D. Coloring Pigments: Pure mineral pigments, lime proof and non-fading; added to mortar by the manufacturer. Job colored mortar is not acceptable.

2.2 MORTAR

ASTM C270, Type S. No admixtures permitted. Type N lime is not permitted.

PART 3 - EXECUTION

3.1 INSPECTION

Ensure that substrate is without voids or projections that would interfere with installation of brick paving.

3.2 ALLOWABLE TOLERANCES

A. Paved surface true to plane within 3 mm (1/8 inch) in 3 m (10 feet) not cumulative.

B. Joint width deviation not greater than 10 percent of dimension shown.

3.3 APPLICATION

A. General: Do not use bricks with chips, cracks, discoloration, or other visible defects.

B. Installation with Portland Cement Mortar:

1. Install brick in full bed joint. Remove excess mortar. Strike joints flush with top surface of brick and tool slightly concave.
2. Cure mortar by maintaining in a damp condition for seven days.

- - - E N D - - -

TRL Systems
When Reliability Counts

VA LOMA LINDA
HEALTHCARE SYSTEM

11201 BENTON STREET, LOMA LINDA, CA 92357

EXPAND EMERGENCY DEPARTMENT NURSE CALL SYSTEM ADDITION

MATERIAL SUBMITTAL

JOB # 4516

9531 Milliken Avenue ● Rancho Cucamonga, CA 91730 ● (909) 390-8392 ● Fax (909) 390-8397 ● Lic. No. 413747
E-mail: info@trlsystems.com ● www.trlsystems.com

PRODUCT SHEET

Product:	Telligence Station Gateway
	HC-GTWY1
	HC-GTWY1-3K

TELLIGENCE STATION GATEWAY

Features

- Connects up to 40 devices (Dome Lights, Smart Stations, Duty Stations) to the Telligence IP network
- Standard RJ-45 snap-in connectors speed installation and maintenance
- Industry standard Cat 5/5e/6 cabling simplifies installation
- Rack mountable in one 48.3 cm (19 in) wide rack space
- Compact and easy to install in remote closets

The Telligence Station Gateway facilitates the use of non-IP addressable stations on the Telligence IP network by converting analog audio signals into digital audio data and vice versa. Each gateway supports up to 40 devices, including single and dual Patient Stations, and Staff Stations.

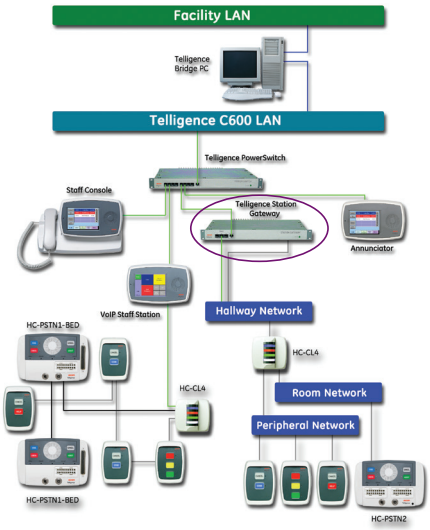
Suitable for rack mounting in a remote closet, the gateway occupies one space in a standard 48.3 cm (19 in) wide EIA equipment rack. Device wiring is via industry standard Cat 5/5e/6 cable. An AC power source is required.

The Telligence Station Gateway is an integral part of the Telligence patient-staff communications system that serves as a gateway between the nurse call IP network and the RS-485 hallway network. It is the pivot point for all Dome Lights, Smart Patient and Staff Stations, and Peripheral Devices. Once installed, the gateway is transparent to the end-user. The Telligence Station Gateway acquires its IP address dynamically from the Telligence Bridge.

PERFORMANCE SPECIFICATIONS

The Telligence Station Gateway provides communication between the IP Network and up to 40 devices. The unit communicates with the Smart Stations using Cat 5/5e/6 cabling. The Telligence Station Gateway is rack mountable (one rack unit high).

PRODUCT SHEET: TELLIGENCE STATION GATEWAY



Power specifications	
Power source	120 VAC
Electrical rating	Input 120 VAC, 120 W
	Output 40 VDC, 100 W
Power dissipation	120 W (427 BTUs)
Fuse	2.5 Amp AC line
Indicators	Green LED for AC power
Terminations	1 "Ethernet" RJ-45 port,
	1 "AUX" RJ-45 port,
	1 "Port A" RJ-45 port
	1 "Port B" RJ-45 port
	1 "TO DOME LIGHTS" terminal strip (40 VDC 100 W)
Physical specifications	
Dimensions (H x W x D)	4.4 x 48.3 x 30.5 cm (1.75 x 19 x 12 inch)
Mounting	48.3 cm (19 inch) wide rack mountable, wall mounting in standard third-party sectional cabinet
Certifications	
UL, CAN/CSA C22.2 No. 205, FCC (Part 15, Class A)	
State of California, Office of Statewide Health Planning and Development, Special Seismic Certification Pre-approval, OSP-0207-10	

Ordering information

Telligence Station Gateway	
HC-GTWY1	Telligence Station Gateway 4.88 kg (10 lbs, 12 oz)
HC-GTWY1-3K	Telligence Station Gateway supports Telligence C300 devices 4.88 kg (10 lbs, 12 oz)

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

PRODUCT SHEET

Product: ColorTouch Staff Console

HC-CONSOLE-E

COLORTOUCH STAFF CONSOLE

Features

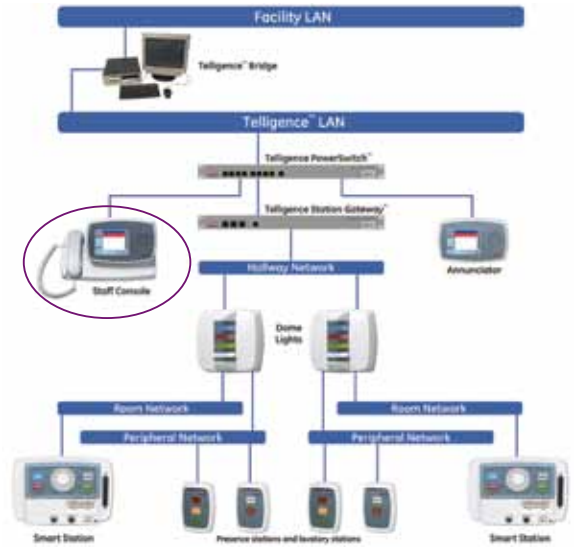
- **14.2 cm (5.6 in) backlit ColorTouch screen display** Easy to read and simple to configure with soft keys and customizable labels
- **VoIP and Powered Ethernet** Category 5/5e/6 type wiring carries voice, data, and power on a single cable
- **Fully adjustable viewing angle** Easy on the eyes under all lighting conditions
- **Unique tone associated with highest priority call** Important incoming calls are identified uniquely
- **320 x 240 LCD resolution** Bright high contrast display provides a clear picture
- **Full duplex speaker/microphone** Hands-free communications for busy caregivers
- **One-touch call answer** Simple operation helps ensure timely responses
- **RJ-45 connectivity** Standard snap-in connectors help speed installation and maintenance
- **Multiple menu screens** Concise information in a small footprint
- **Enhanced audio** Helps to improve audio quality in noisy environments
- **Passwords protect selected functions** Functions that can be restricted include Audio Page, Swing/Capture/Share and volume adjustments

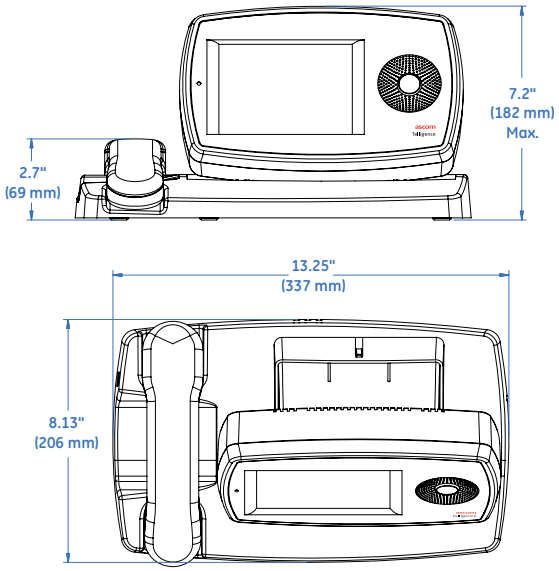
The ColorTouch™ Staff Console is a primary point of contact among users of the Telligence™ patient-staff communications system. It operates as both a user interface and a communications device that sends and receives data and audio signals over the Telligence IP network.

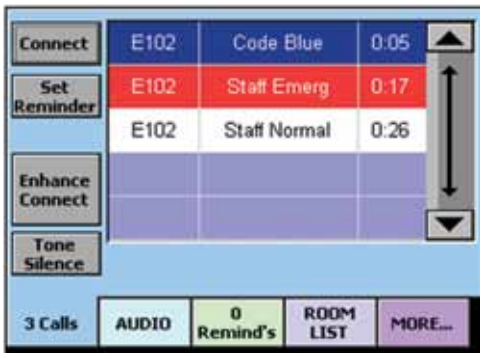
As a user interface, the ColorTouch Staff Console graphically displays incoming calls from stations and connected healthcare equipment, and provides a means for the operator to prioritize and respond to selected events. As an audio device, it provides audible signaling functions and facilitates two-way full-duplex staff/patient and staff/staff communications. Enhanced audio helps to improve audio quality in noisy environments.

Passwords protect selected functions to restrict usage to approved users. Functions that can be restricted include Audio Page, Swing/Capture/Share and volume adjustments.

The ColorTouch Staff Console comes configured for desktop use. It includes a handset and cradle for privacy, or supports hands-free operation by means of its on-board full duplex speaker/microphone.







TECHNICAL SPECIFICATIONS

The ColorTouch Staff Console resides on the Telligence LAN/WAN and communicates with other IP devices over a single standard Category 5/5e/6 cable. This cable provides input and output for data and audio, as well as all necessary operating power for the device.

Assignment information relevant to each Staff Console may be stored locally in its on-board memory or centrally at the configuration server. The ColorTouch Staff Console is set up using Telligence configuration tools. This programming determines whether or not a call or system event will display at the ColorTouch Staff Console, and whether an audio connection should be established.

By subscribing to predetermined devices and events, the ColorTouch Staff Console can be set up to provide only the most relevant information at all times. Data is only sent to subscribed points, rather than being broadcast across the entire network. This powerful Telligence feature helps keep data flow down and communications speeds up.

INSTALLATION

The ColorTouch Staff Console resides on the Telligence LAN as an IP device. It connects to the Telligence network with a Telligence PowerSwitch. Interconnection is by means of Category 5/5e/6 cable with RJ-45 connectors. Cabling carries data, audio, as well as all required operating power for the device.

Technical specifications	
Audio output	Speaker/microphone for full duplex speakerphone mode or handset
Audio bandwidth	Approximately 64 kbps without compression
Power specifications	
Electrical rating	40 VDC, 10.4 W
Power source	Powered Ethernet from PowerSwitch
Compatibility	Telligence patient-staff communication networks
Physical specifications	
Dimensions (H x W x D)	33.7 x 20.6 x 18.2 cm (13.25 x 8.13 x 7.2 inch)
Mounting	Desktop
Construction and finish	Cycoloy® finished with a light texture to reduce fingerprints
Flammability rating	94 V-0
Terminations	RJ-45
Controls	Touch screen
Certifications	
UL 1069, CSA (22.2 No. 205-M1983), FCC (Part 15, Class A)	

PERFORMANCE SPECIFICATIONS

Provide ColorTouch Staff Console(s) at the location(s) specified on the drawing. The equipment is a Voice over IP, desk mounted communication device with integral handset and color display. The housing features a 14.2 cm (5.6 in) backlit color touch screen display. The ColorTouch Staff Console is powered via the local area network connection and connects to the system using Cat 5/5e/6 cabling. The ColorTouch Staff Console provides complete full-duplex two-way Voice over IP and visible communications. The ColorTouch Staff Console is capable of serving a total of 1024 Smart Patient and Staff/Duty Stations.

The ColorTouch Staff Console is the primary control and monitoring point for voice communications and signaling functions. Users are capable of selecting full-duplex voice communication by means of the Staff Console's handset or hands free speakerphone.

The ColorTouch Staff Console provides a bright, easy-to read 14.2 cm (5.6 in) color touch screen display that provides at-a-glance visible indication of incoming calls, queued messages, and status indications. The ColorTouch Staff Console display provides an active call display showing location with priority and text message; individual call waiting messages showing the next call's location and priority; and the ability to scroll through the call queue.

The ColorTouch Staff Console provides a telephone dial pad screen for selecting individual stations, telephone dialing, and other numeric functions. The ColorTouch Staff Console's default screen shows all active calls in order of priority. On screen UP/DOWN scroll arrows on the right side of the touchscreen allow the operator to view all calls from subscribed stations. Each call will indicate the room number, call type, and time elapsed since the call was made. Additional touch-screen buttons along the bottom of the display remain in view at all times.

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

[PRODUCT SHEET]

Product:	Smart Patient and Staff/Duty Stations
	HC-PSTN1
	HC-PSTN2
	HC-CCPSTN
	HC-DUTY

SMART PATIENT AND STAFF/ DUTY STATIONS

Features

- **Integrated call cord and pillow speaker connections** One device, many functions
- **NiteLite on-board lighting** Easy visibility under low ambient light conditions
- **Dual patient models available** Economical in semi-private room settings
- **On-board speaker and microphone** Full duplex operation for intercom use
- **Configurable buttons and button labels** Buttons can be individually defined and configured in the field
- **Cleaning mode** Helps to reduce calls when cleaning stations
- **Audible, visible and tactile pushbutton feedback** Each press of a button sounds a tone, produces a response the user can feel, and lights the associated LED
- **Mounts to a standard 3-gang ring on a non-masonry box** Simple to install, clean finished appearance with no visible screws
- **RJ-45 connectivity** Standard plug-in terminations make wiring simple
- **No DIP switches to set** Network addressable for easy setup and installation
- **Each bed call answered individually** Person-to-person communication helps to ensure privacy

Smart Patient and Staff/Duty Stations are a primary point of two-way communications between patients and staff. Equipped with three call buttons and a cancel button, they offer users an easy-to-operate means of placing calls on the patient-staff communications system.

With a built-in speaker and microphone, these devices also provide patients with the means of having a full-duplex channel of audio communications with attending staff, and vice versa. On-board LEDs provide operational feedback as well as status indication.

Smart Patient Stations (HC-PSTN1 & HC-PSTN2) provide separate 18-pin receptacles for the connection of pillow speakers. Each Smart Patient Station also comes equipped with two 0.64 mm (0.25 in) receptacles that can be programmed to accept either an input from auxiliary equipment, or a bed call cord.

Single Smart Patient Stations (HC-PSTN1) provide one set of connections. Dual Smart Patient Stations (HC-PSTN2) provide two sets of connections. Smart Staff/Duty Stations (HC-DUTY) have no bed connections or call cord jacks.

Call Cord Patient Stations (HC-CCPSTN) come equipped with two 0.64 mm (0.25 inch) receptacles that can be programmed to accept either an input from auxiliary equipment or a bed call cord(s). Can be configured to support one or two patient beds.

All stations provide a NiteLite on-board lighting feature for easy visibility under low ambient light conditions. They feature a snap-together design with no mounting screws visible after installation. Their clean, modern look complements any decor.

Smart Patient and Staff/Duty Stations are installed in unobstructed areas next to patient beds. Single Smart Patient Stations serve the needs of one patient. Dual Smart Patient Stations are installed between two beds and have two sets of connectors, one for each bed. Smart Staff/Duty Stations are installed in break rooms and other areas where staff may be reached. They do not have bed connections.

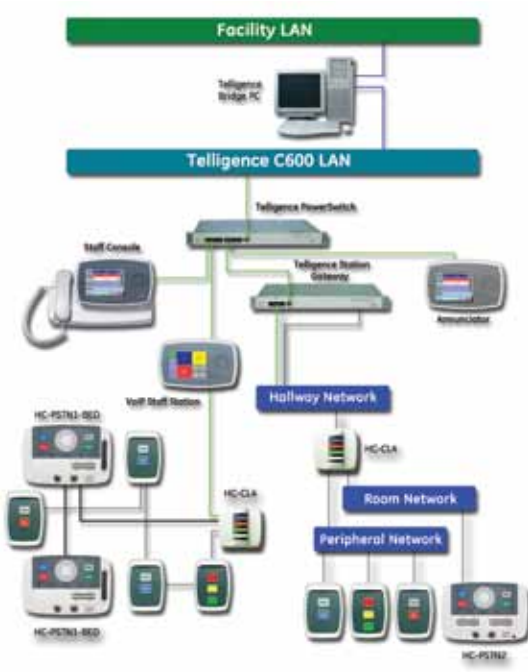
Calls placed on Smart Patient and Staff/Duty Stations register and annunciate at ColorTouch VoIP Staff Consoles and ColorTouch VoIP Annunciators. Connected Infinity LED dome/zone lights will also operate appropriately depending on the nature and urgency of the call. These stations also provide full-duplex audio communications that allow users to speak with Staff Consoles and Annunciators.

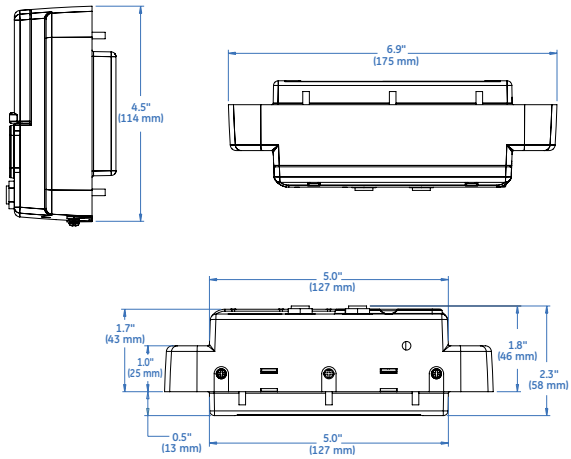
TECHNICAL SPECIFICATIONS

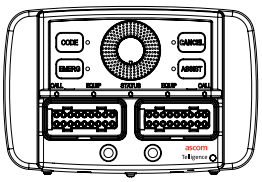
Installation

Smart Patient and Staff/Duty Stations connect to the Telligence LAN/WAN through the Telligence Station Gateway, which provides all necessary power to the device. Stations are connected to the gateway via their associated dome light. Snap-in RJ-45 connections terminate at the station and the dome light. Stations are network addressable and there are no DIP switches or jumpers to set. They mount to standard 3-gang backboxes.

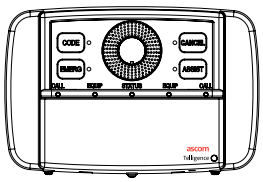
Power specifications	
Electrical rating	
Single Smart Patient Station	40 VDC, 1.9 W
Smart Staff/Duty Station	40 VDC, 1.9 W
Dual Smart Patient Station	40 VDC, 2.2 W
Power source	Telligence Station Gateway
Physical specifications	
Dimensions (H x W x D)	11.4 x 17.5 x 5.8 cm (4.5 x 6.9 x 2.3 in)
Mounting	Wall mounting, 3 gang ring on a non-masonary box.
Construction	Cycoloy®
Flammability rating	94 V-0
Terminations	RJ-45, plus lever-type connectors for TV/Lighting control options
Indicators	LEDs for CODE, EMERG, CANCEL, ASSIST
IP address requirements	None
Audio input	Microphone
Audio output	Speaker for full-duplex intercom
Controls	Buttons for CODE, EMERG, CANCEL and ASSIST
Certifications	
UL, CSA (22.2 No. 205-M1983)	



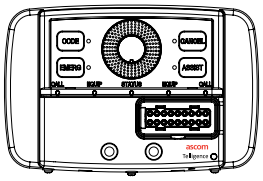




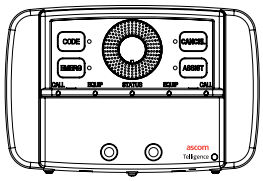
Dual Smart Patient Stations (HC-PSTN2) provide two sets of connections.



Smart Staff/Duty Stations (HC-DUTY) have no bed connections or call cord jacks.



Single Smart Patient Stations (HC-PSTN1) provide one set of connections.



Call Cord Smart Patient Stations (HC-CCPSTN) provide two 0.64 mm (0.25 in) connectors.

Ordering information

Smart Patient and Staff Duty Stations		
Model #	Description	Shipping weight
HC-PSTN1	Single Smart Patient Station	0.41 kg (0.90 lb)
HC-PSTN2	Dual Smart Patient Station	0.41 kg (0.90 lb)
HC-CCPSTN	Call Cord Smart Patient Station	0.41 kg (0.90 lb)
HC-DUTY	Smart Staff/Duty Station	0.41 kg (0.90 lb)
HC-AP-W-4G/3G	Adaptor plate, white 4-gang to 3-gang	0.23 kg (0.50 lb)
HC-AP-W-6G/3G	Adaptor plate, white 6-gang to 3-gang	0.23 kg (0.50 lb)

PERFORMANCE SPECIFICATIONS

Provide Smart Patient and Staff/Duty Stations at the locations specified. The Smart Patient and Staff/Duty Stations install on a 3-gang plaster ring and use a snap-together design with no visible mounting screws after the unit has been installed. All terminations on the Smart Patient and Staff/Duty Stations are on RJ-45 connectors. All addressing of the Smart Patient and Staff/Duty Stations is automatic using an intelligent addressing scheme and does not require any manual addressing using DIP switches at the station location. The Smart Patient and Staff/Duty Stations have a NiteLite feature for visibility in dark rooms. The Smart Patient and Staff/Duty Station buttons are software-configurable and have field-replaceable button labels using a label insert behind the clear button membrane.

Each Smart Patient and Staff/Duty Station is molded from Cycoloy.® A central Telligence Station Gateway supplies all power for the Smart Patient and Staff/Duty Stations.

Three of the buttons on the Patient or Staff/Duty Station may be configured in the field for different functions depending on the need. Customizable labels simply slide behind the switch membrane. Switch functions are set on the Telligence network with software programming tools.

Users operate the station by pressing one of the buttons on the front of the unit. Calls may also be placed by operating a connected call cord or pillow speaker.

Typical station functions include:

CODE: This button initiates a code blue call that activates the corridor light and is displayed on the Staff Console or Annunciator. The system can be configured to automatically page a predetermined staff when this button is pressed

EMERG: When this button is pressed a staff emergency call goes out to the staff console or annunciator and activates the corridor light accordingly.

ASSIST: This button initiates a normal priority call that is displayed on the staff console or annunciator and the corridor light is activated accordingly.

CANCEL: This button clears all active calls registered at the station.

LEDs adjacent to each button on the Patient or Staff/Duty Station indicate the type of call that is placed. Additional LEDs indicate the status of auxiliary hardware and, for dual patient stations, provide visual cues concerning which bed the call originated from. All stations feature NiteLite technology for easy visibility under low ambient light conditions.

Smart Patient and Staff/Duty Stations feature an ingenious cleaning mode that helps to prevent false calls on the system. When the station is idle, pressing the CANCEL button for between two and four seconds temporarily disables the front panel buttons. This allows maintenance personnel to clean the unit without fear of accidentally placing a call.

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

[PRODUCT SHEET]

Product: Pillow Speakers and Call Cords

Innovative nurse call features for healthcare facilities

PILLOW SPEAKERS AND CALL CORDS INNOVATIVE NURSE CALL FEATURES FOR HEALTHCARE FACILITIES

Features

- Standard 0.25 inch call cord connectors compatible for use with Telligence and ProCare patient-staff communication systems
- Large easy-to-operate buttons leave nothing to chance
- DuraPin pillow speaker connectors stay in place, won't pull free with normal use
- Large variety of devices for a wide range of applications
- Optional call cord cable lengths suitable for most bed configurations
- Smooth shape allows for quick and easy cleaning
- High impact polymer construction for long service life and reliable operation

Ascom Telligence call cords and pillow speakers are sturdy, resilient momentary contact devices used to initiate calls from patient stations. These devices are compatible with Telligence, ProCare™ 2000, and ProCare 6000 Nurse Call Communication Systems.

Call cords come standard with an 8-foot long cord (2.4 m), and typically plug into the Patient Station with a 0.25 inch connector. Simple pushbutton operation places a call on the system.

Pillow speakers provide patient-staff communications functions, as well as television control and room lighting control. Models are available that connect to the Patient Station with a DuraPin connection. Other models provide a 37-pin DSUB connector for use with Hill-Rom® and Stryker® electronic beds. These connectors plug into Telligence Smart Patient Stations with BedConnect.

Pillow speakers are available for RCA,® Zenith,® Philips,® or TeleHealth® equipment. Some pillow speakers are available with a Direct Access option, which provides a numeric keypad to input a specific channel. Channel selection on models without Direct Access is made by pressing the up/down channel buttons.

Call cords feature two types of actuators: standard and air. Standard actuators provide a simple contact closure at the call cord head by means of metal contacts. Air-operated actuators use air pressure to close the contacts. This keeps electrical connections away from the patient, making these devices suitable for oxygen-rich atmospheres. These may be used by patients for whom contact with electricity can present a danger or who don't have the physical dexterity to actuate a standard call cord button.

[PRODUCT SHEET: PILLOW SPEAKERS AND CALL CORDS]

Both air-operated and standard call cords are available in a variety of styles and with a range of cable lengths. They plug into Patient Stations or Call Cord Stations with 0.25 inch jacks.

Ordering information

Air actuated cords	
Model #	**Description**
200-1071	Air Cord Assembly, 6 ft (1.8 m) flexible tube, molded right angle plug, 3.25 inch (8.2 cm) pad air actuator.
200-1072	Air Cord Assembly, 8 ft (2.4 m) flexible tube, molded right angle plug, 1.125 inch (2.9 cm) rubber pushbutton air actuator.
200-1073	Air Cord Assembly, 10 ft (3.0 m) flexible tube, molded right angle plug, 3.25 inch (8.2 cm) pad air actuator.
200-446	Air Cord Assembly, 6 ft (1.8 m) flexible tube with security clamp, molded right angle plug, disc shaped pad actuator.
200-447	Air Cord Assembly, 10 ft (3.0 m) flexible tube with security clamp, molded right angle plug, disc shaped pad actuator.
200-448	Air Cord Assembly, Two 6 ft (1.8 m) flexible tubes with security clamps, single molded right angle plug, disc shaped pad actuators.
200-449	Air Cord Assembly, Two 10 ft (3.0 m) flexible tubes with security clamps, single molded right angle plug, disc shaped pad actuators.
Pushbutton cords	
Model #	**Description**
HC-SCC-8Q	Call Cord Assembly, 8 ft wire cord with security clamp, 0.25 inch molded right angle plug, non-locking sealed pushbutton actuator.
200-1173	Call Cord Assembly, Two 6 ft (1.8 m) wire cords with security clamp, single molded right angle plug, non-locking pushbutton actuators.
200-1174	Call Cord Assembly, Two 12 ft (3.7 m) wire cords with security clamp, single molded right angle plug, non-locking pushbutton actuators.
HC-SCC-8	Call Cord Assembly, 8 ft wire cord with security clamp, 18-pin molded right angle connector, non-locking sealed pushbutton actuator. Integrated Call assurance LED.
Pillow speakers, DuraPin connector	
Model #	**Description**
HC-PSPKR-D-A2	Digital Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart' TV Control, Analog Volume Control, 10' cord
HC-PSPKR-D-D2	Digital Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart'TV Control, Digital Volume Control, 10' cord
HC-PSPKR-DA-A2	Direct Access Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart' TV Control, Analog Vol. Control, 10' cord
HC-PSPKR-DA-D2	Direct Access Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart' TV Control, Digital Volume Control, 10' cord
Pillow speakers, 37-pin connector	
Model #	**Description**
7A2131	Smart Pillow Speaker w/37-pin connector, Room Light, RCA TV Control
7B2131	Smart Pillow Speaker w/37-pin connector, Room Light, Zenith TV Control
7C2131	Smart Pillow Speaker w/37-pin connector, Room Light, Philips TV Control

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

[PRODUCT SHEET]

Product: Peripheral Stations
HC-PB Series
HC-PP Series

PERIPHERAL STATIONS

Features

- Site-configurable buttons
- Field programmable
- Supports Signature Series® 2-wire communications protocol
- Anti-microbial pull cord material
- NiteLite on-board lighting
- Pushbutton or pull cord configurable
- Snap-together design – quick installation, no visible screws
- Mounts to a standard single-gang plaster ring mounted on a 10.2 cm (4 in) backbox
- LED indicators
- Fully supervised
- Toggle On/Off buttons

Note: The Telligence system should not be used in lieu of an NFPA compliant fire alarm system.

Peripheral Stations are available in two types, push/pull stations and pushbutton stations. These Peripheral Stations are addressable initiating devices that provide call-for-assistance indication. When a Peripheral Station is activated, visual indication of the call displays at an associated dome light and an appropriate call indication registers on the staff console, as well as on any installed annunciators.

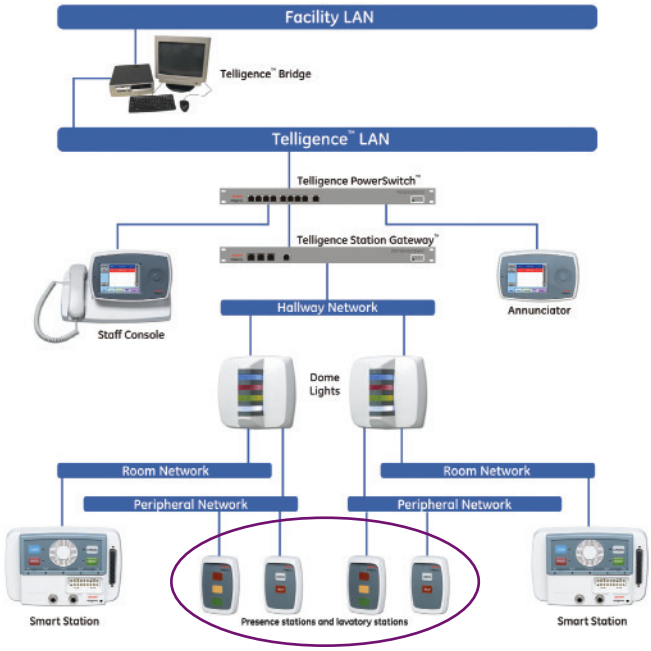
Models come with field-configurable buttons used for placing patient calls, requesting staff assistance, indicating staff presence, or signaling a code blue situation. There are also models that include a relay for activating an elapsed timer or similar device, or a supplemental input for a room smoke detector. All models come with a dedicated button for canceling calls.

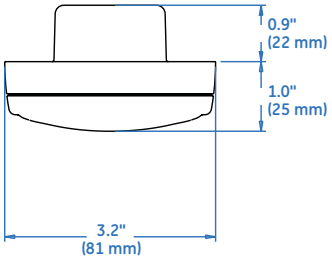
Thanks to their innovative slide-behind membranes, Peripheral Station buttons are easily labeled in the field. This helps make setup and installation of these devices a simple task.

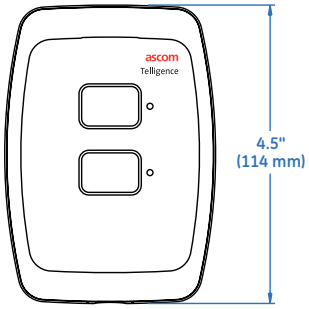
In addition to pushbutton operation, Peripheral Stations may also be fitted with optional non-contaminant polyvinyl pull cords, which can be used to to activate calls.

Peripheral Stations are configurable for "Toggle On / Toggle Off" buttons allowing bed management, patient flow, work flow and other non-clinical type events.

All stations provide a NiteLite™ on-board lighting feature for easy visibility under low ambient light conditions. They feature a snap-together design with no mounting screws visible after installation.







PERFORMANCE SPECIFICATIONS

The Peripheral Stations install on a single-gang ring on a 10.2 cm (4 in) wide non-masonary box and use a snap-together design with no visible mounting screws after it has been installed. The Peripheral Station communicates to the patient-staff communications system using a single pair of circulating wires to connect all patient room peripheral devices to the Dome Light. The Peripheral Station has quick connect terminations for the wires. All addressing of the Peripheral Station is automatic using an intelligent addressing scheme and does not require any manual addressing using DIP switches. The Peripheral Station has a NiteLite feature for visibility in dark rooms. The Peripheral Station has software configurable buttons and field replaceable button legends using a label inserted behind the clear button membrane.

TECHNICAL SPECIFICATIONS

Installation

Peripheral Stations receive all data and power from a single pair of wires originating from the Telligence Station Gateway and routed through an adjacent Infinity™ LED Dome/Zone Light. A single data pair of wires may serve all the Periperal Stations in a patient area.

Stations mount to a standard single-gang ring on a 10.2 cm (4in) wide non-masonry box. Wiring is terminated at a quick-connect terminal block.

The peripheral pull cord station may be installed in wet areas by using the water resistant gasket. Using this gasket will not make the station water-proof. The station must be mounted in a location so that it will not be in constant contact with water spray or splashing. It is recommended to install the station at the same height or higher than the highest mounted shower head, and ideally on the wall opposite the shower head.

Peripheral Stations are installed wherever patients or staff may require assistance, or where it is desirable to activate calls in the patient-staff communications system. These stations support unlimited button types.

Typical configurable button types include:

- **CODE** (code blue)
- **EMERG** (emergency)
- **HELP** (lavatory/shower)
- **STAFF** (staff assist)
- **CALL** (remote call)
- **CANCEL** (remote cancel)
- **CODE** (code pink)
- **FAMILY** (housekeeping)
- **URGENT**

Each pushbutton has a dedicated LED indicator.

Because they are Signature Series devices, these stations are completely self-addressable and there are no DIP switches or jumpers to set. The communications system automatically recognizes and maps each device.

Power specifications	
Electrical rating	19 VDC, .12 W
Physical specifications	
Dimensions (H x W x D)	11.4 x 8.1 x 4.7 cm (4.5 x 3.2 x 1.9 in)
IP address requirements	None
Construction and finish	GE Cycoloy finished with a light texture to reduce fingerprints
Mounting	Single-gang ring on a 10.2 cm (4 in) wide non-masonary box
Flammability rating	94 V-0
Terminations	Quick terminal strip
Indicators	LEDs, one per button and one for back/front lighting
Controls	Field configurable membrane buttons
Certifications	
UL, CSA (22.2 No. 205-M1983)	

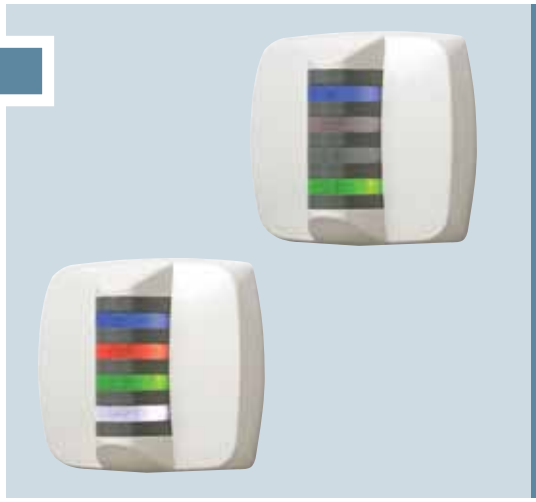
Ordering information

Peripheral stations		
Model #	Description	Shipping weight
HC-PP3-PRES	3-Button Push/Pull Station-Presence	0.12 kg (0.25 lb)
HC-PB2-CALLIN	2-Button Station-Staff Normal Call w/Smoke Input	0.12 kg (0.25 lb)
HC-PB3-CANCEL	3-Button Station-Remote Cancel	0.12 kg (0.25 lb)
HC-PB2-CODE	2-Button Station-Code Blue	0.12 kg (0.25 lb)
HC-PB2-EMERG	2-Button Station-Staff Emergency	0.12 kg (0.25 lb)
HC-PP2-LAV	2-Button Push/Pull Station-Lavatory	0.12 kg (0.25 lb)
HC-PB2-CALLR	2-Button Call Station – With Relay	0.12 kg (0.25 lb)
HC-WPGSKT-1G	Water resistant gasket kit for peripheral station	0.12 kg (0.25 lb)
HC-RPLMT-CLCD-R	Red replacement Call Cord Kit for Peripheral Stations (includes mounting plate)	0.23 kg (0.50 lb)
HC-RPLMT-CLCD-W	White replacement Call Cord Kit for Peripheral Stations (includes mounting plate)	0.23 kg (0.50 lb)
HC-AP-W-2G/1G	Adaptor plate, white 2-gang to 1-gang	0.23 kg (0.50 lb)
HC-AP-W-3G/1G	Adaptor plate, white 3-gang to 1-gang	0.23 kg (0.50 lb)
HC-AP-W-4G/1G	Adaptor plate, white 4-gang to 1-gang	0.23 kg (0.50 lb)
HC-AP-W-3G/2X1G	Adaptor plate, white 3-gang to two 1-gang openings	0.23 kg (0.50 lb)
HC-AP-W-6G/3X1G	Adaptor plate, white 6-gang to three 1-gang openings	0.23 kg (0.50 lb)

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

PRODUCT SHEET

Product: Infinity Dome and Zone Lights
HC-CLx-Series



INFINITY DOME AND ZONE LIGHTS

Features

- Long-lasting LED technology
- Software-controlled lamp colors
- Junction point for simple room and hall cabling
- Flexible installation options
- Durable housing
- Continually communicates over the Telligence network to report status

Infinity Series LED dome lights provide bright, easy-to-see visual annunciation that help to speed response time and enhance caregiver communication. These devices are typically installed in corridors and outside patient rooms to provide staff with a visual cue as to the origin of a call placed on the system.

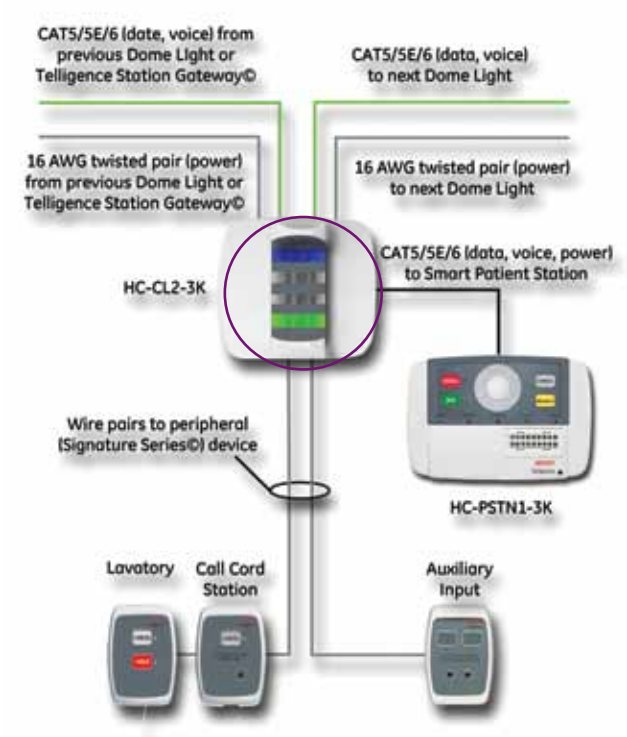
Infinity series LED dome lights operate in a similar fashion to Annunciator panels or Staff Consoles: the light color and flash rate indicate the type and priority of the call. Models are available with one, two or four light sections.

Thanks to advanced LED technology, the HC-CL4, HC-CL4-SUPV and HC-CL2 are software-configurable to illuminate nine colors: blue, red, green, white, amber, yellow, magenta, cyan and pink. The HC-CL2-3K dome lights are software-configurable to illuminate five colors: white, red, blue, green and amber. This innovative capability means that one model can serve many different purposes.

Dome lights provide a visual cue to responders, indicating the part of the building where the call originated. Infinity series LED dome lights can function as either zone or corridor lights. Zone lights are mounted at entrance to hallways; corridor lights are mounted outside each patient's room.

PERFORMANCE SPECIFICATIONS

Corridor lamps have up to four sections with color configurable LEDs in each section. Dome lights utilize multicolor LEDs with a minimum of 15 lumens per section. Each lamp is molded from Cycoloy.® The translucent diffuser on the dome light is visible from 180 degrees. The dome lights operate on low voltage and mount to a standard 1-gang or 2-gang electrical box. Dome lights serve as a junction point for all patient room wiring and corridor wiring.



TECHNICAL SPECIFICATIONS

Installation

The Infinity Series LED dome (corridor) light connects directly to the applicable room or corridor Telligence Station Gateway by means of a snap-in RJ-45 termination. It then becomes the junction point for all the connections made in the associated area. The station gateway provides power to the Infinity Series LED dome (corridor) light, as well as to other peripheral devices.

Infinity Series LED dome (corridor) lights are mounted to standard 1-gang or 2-gang (recommended) electrical boxes. They may be oriented for wall or ceiling installation. LED lamps do not require replacement and are not field serviceable.

Power specifications	
Electrical rating	HC-CL1-RED: 40 VDC, .84 W
	HC-CL2: 40 VDC, 1.2 W
	HC-CL4: 40 VDC, 2.0 W
	HC-CL4-SUPV: 40 VDC, 2.2 W
	HC-CL2-3K: 40 VDC, 1.2 W
Physical specifications	
Dimensions (H x W x D)	11.9 x 12.7 x 7 cm (4.7 x 5 x 2.75 in)
Shipping weight	0.35 kg (0.78 l
Mounting	1-gang or 2-gang (recommended) back box
Construction	Cycoloy®
Flammability rating	94 V-0
Terminations	RJ-45 and lever type connector
Indicators	LEDs capable of seven different colors
Compatibility	Telligence patient-staff communications networks
Certifications	
UL, CSA (22.2 No. 205-M1983)	

Ordering information

Infinity Dome and Zone Lights		
Model #	**Description**	**Shipping weight**
HC-CL1-RED	LED Dome/Zone Light, 1 Section	0.35 kg (0.78 lb)
HC-CL2	Infinity LED Dome/Zone Light, 2 Sections	0.35 kg (0.78 lb)
HC-CL4	Infinity LED Dome/Zone Light, 4 Sections	0.35 kg (0.78 lb)
HC-CL4-SUPV	LED Dome/Zone Light, 1 Section	0.35 kg (0.78 lb)
HC-CL2-3K	Infinity LED Dome/Zone Light, 2 Sections, Telligence C300	0.35 kg (0.78 lb)

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

TRL Systems
When Reliability Counts

VA LOMA LINDA
HEALTHCARE SYSTEM

11201 BENTON STREET, LOMA LINDA, CA 92357

EXPAND EMERGENCY DEPARTMENT NURSE CALL SYSTEM ADDITION

MATERIAL SUBMITTAL

JOB # 4516

9531 Milliken Avenue ● Rancho Cucamonga, CA 91730 ● (909) 390-8392 ● Fax (909) 390-8397 ● Lic. No. 413747
E-mail: info@trlsystems.com ● www.trlsystems.com

PRODUCT SHEET

Product:	Telligence Station Gateway
	HC-GTWY1
	HC-GTWY1-3K

TELLIGENCE STATION GATEWAY

Features

- Connects up to 40 devices (Dome Lights, Smart Stations, Duty Stations) to the Telligence IP network
- Standard RJ-45 snap-in connectors speed installation and maintenance
- Industry standard Cat 5/5e/6 cabling simplifies installation
- Rack mountable in one 48.3 cm (19 in) wide rack space
- Compact and easy to install in remote closets

The Telligence Station Gateway facilitates the use of non-IP addressable stations on the Telligence IP network by converting analog audio signals into digital audio data and vice versa. Each gateway supports up to 40 devices, including single and dual Patient Stations, and Staff Stations.

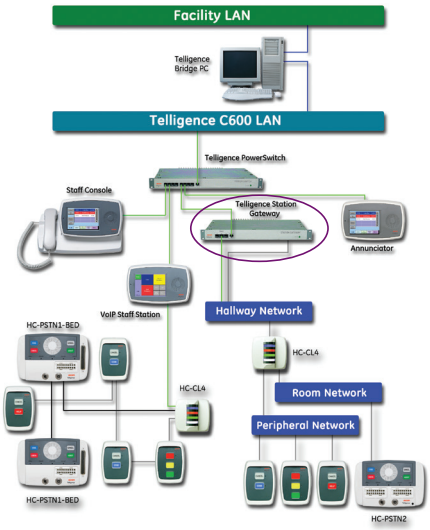
Suitable for rack mounting in a remote closet, the gateway occupies one space in a standard 48.3 cm (19 in) wide EIA equipment rack. Device wiring is via industry standard Cat 5/5e/6 cable. An AC power source is required.

The Telligence Station Gateway is an integral part of the Telligence patient-staff communications system that serves as a gateway between the nurse call IP network and the RS-485 hallway network. It is the pivot point for all Dome Lights, Smart Patient and Staff Stations, and Peripheral Devices. Once installed, the gateway is transparent to the end-user. The Telligence Station Gateway acquires its IP address dynamically from the Telligence Bridge.

PERFORMANCE SPECIFICATIONS

The Telligence Station Gateway provides communication between the IP Network and up to 40 devices. The unit communicates with the Smart Stations using Cat 5/5e/6 cabling. The Telligence Station Gateway is rack mountable (one rack unit high).

PRODUCT SHEET: TELLIGENCE STATION GATEWAY



Power specifications	
Power source	120 VAC
Electrical rating	Input 120 VAC, 120 W
	Output 40 VDC, 100 W
Power dissipation	120 W (427 BTUs)
Fuse	2.5 Amp AC line
Indicators	Green LED for AC power
Terminations	1 "Ethernet" RJ-45 port,
	1 "AUX" RJ-45 port,
	1 "Port A" RJ-45 port
	1 "Port B" RJ-45 port
	1 "TO DOME LIGHTS" terminal strip (40 VDC 100 W)
Physical specifications	
Dimensions (H x W x D)	4.4 x 48.3 x 30.5 cm (1.75 x 19 x 12 inch)
Mounting	48.3 cm (19 inch) wide rack mountable, wall mounting in standard third-party sectional cabinet
Certifications	
UL, CAN/CSA C22.2 No. 205, FCC (Part 15, Class A)	
State of California, Office of Statewide Health Planning and Development, Special Seismic Certification Pre-approval, OSP-0207-10	

Ordering information

Telligence Station Gateway	
HC-GTWY1	Telligence Station Gateway 4.88 kg (10 lbs, 12 oz)
HC-GTWY1-3K	Telligence Station Gateway supports Telligence C300 devices 4.88 kg (10 lbs, 12 oz)

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

PRODUCT SHEET

Product: ColorTouch Staff Console

HC-CONSOLE-E

COLORTOUCH STAFF CONSOLE

Features

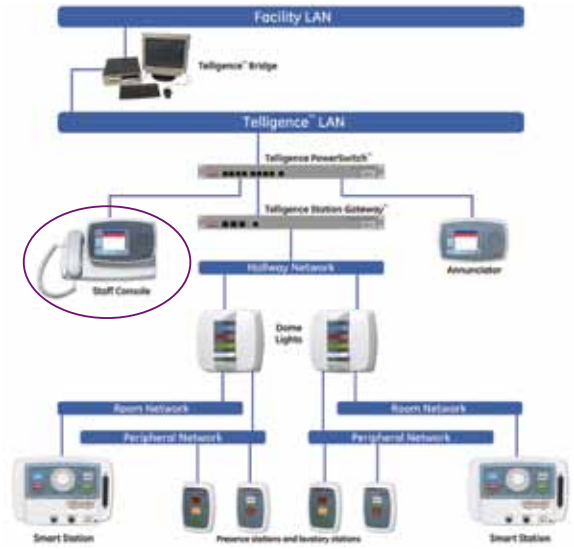
- **14.2 cm (5.6 in) backlit ColorTouch screen display** Easy to read and simple to configure with soft keys and customizable labels
- **VoIP and Powered Ethernet** Category 5/5e/6 type wiring carries voice, data, and power on a single cable
- **Fully adjustable viewing angle** Easy on the eyes under all lighting conditions
- **Unique tone associated with highest priority call** Important incoming calls are identified uniquely
- **320 x 240 LCD resolution** Bright high contrast display provides a clear picture
- **Full duplex speaker/microphone** Hands-free communications for busy caregivers
- **One-touch call answer** Simple operation helps ensure timely responses
- **RJ-45 connectivity** Standard snap-in connectors help speed installation and maintenance
- **Multiple menu screens** Concise information in a small footprint
- **Enhanced audio** Helps to improve audio quality in noisy environments
- **Passwords protect selected functions** Functions that can be restricted include Audio Page, Swing/Capture/Share and volume adjustments

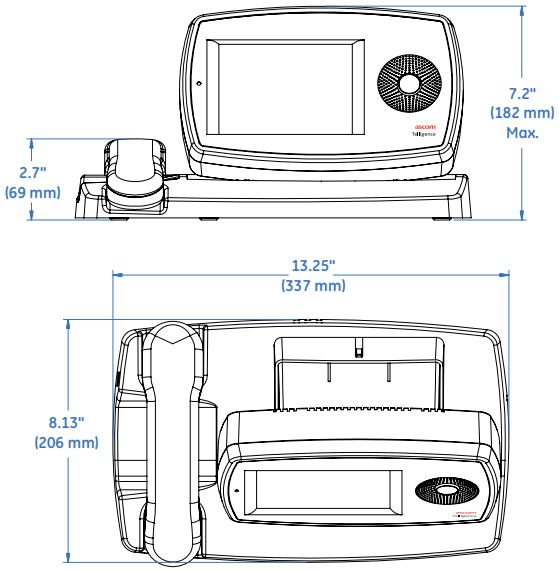
The ColorTouch™ Staff Console is a primary point of contact among users of the Telligence™ patient-staff communications system. It operates as both a user interface and a communications device that sends and receives data and audio signals over the Telligence IP network.

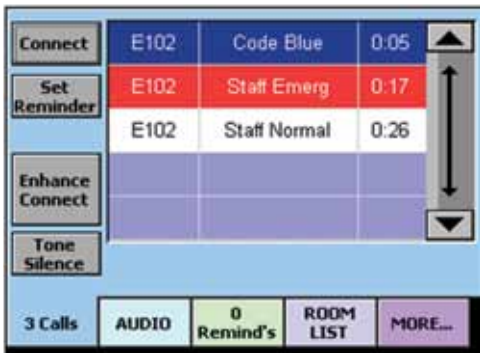
As a user interface, the ColorTouch Staff Console graphically displays incoming calls from stations and connected healthcare equipment, and provides a means for the operator to prioritize and respond to selected events. As an audio device, it provides audible signaling functions and facilitates two-way full-duplex staff/patient and staff/staff communications. Enhanced audio helps to improve audio quality in noisy environments.

Passwords protect selected functions to restrict usage to approved users. Functions that can be restricted include Audio Page, Swing/Capture/Share and volume adjustments.

The ColorTouch Staff Console comes configured for desktop use. It includes a handset and cradle for privacy, or supports hands-free operation by means of its on-board full duplex speaker/microphone.







TECHNICAL SPECIFICATIONS

The ColorTouch Staff Console resides on the Telligence LAN/WAN and communicates with other IP devices over a single standard Category 5/5e/6 cable. This cable provides input and output for data and audio, as well as all necessary operating power for the device.

Assignment information relevant to each Staff Console may be stored locally in its on-board memory or centrally at the configuration server. The ColorTouch Staff Console is set up using Telligence configuration tools. This programming determines whether or not a call or system event will display at the ColorTouch Staff Console, and whether an audio connection should be established.

By subscribing to predetermined devices and events, the ColorTouch Staff Console can be set up to provide only the most relevant information at all times. Data is only sent to subscribed points, rather than being broadcast across the entire network. This powerful Telligence feature helps keep data flow down and communications speeds up.

INSTALLATION

The ColorTouch Staff Console resides on the Telligence LAN as an IP device. It connects to the Telligence network with a Telligence PowerSwitch. Interconnection is by means of Category 5/5e/6 cable with RJ-45 connectors. Cabling carries data, audio, as well as all required operating power for the device.

Technical specifications	
Audio output	Speaker/microphone for full duplex speakerphone mode or handset
Audio bandwidth	Approximately 64 kbps without compression
Power specifications	
Electrical rating	40 VDC, 10.4 W
Power source	Powered Ethernet from PowerSwitch
Compatibility	Telligence patient-staff communication networks
Physical specifications	
Dimensions (H x W x D)	33.7 x 20.6 x 18.2 cm (13.25 x 8.13 x 7.2 inch)
Mounting	Desktop
Construction and finish	Cycoloy® finished with a light texture to reduce fingerprints
Flammability rating	94 V-0
Terminations	RJ-45
Controls	Touch screen
Certifications	
UL 1069, CSA (22.2 No. 205-M1983), FCC (Part 15, Class A)	

PERFORMANCE SPECIFICATIONS

Provide ColorTouch Staff Console(s) at the location(s) specified on the drawing. The equipment is a Voice over IP, desk mounted communication device with integral handset and color display. The housing features a 14.2 cm (5.6 in) backlit color touch screen display. The ColorTouch Staff Console is powered via the local area network connection and connects to the system using Cat 5/5e/6 cabling. The ColorTouch Staff Console provides complete full-duplex two-way Voice over IP and visible communications. The ColorTouch Staff Console is capable of serving a total of 1024 Smart Patient and Staff/Duty Stations.

The ColorTouch Staff Console is the primary control and monitoring point for voice communications and signaling functions. Users are capable of selecting full-duplex voice communication by means of the Staff Console's handset or hands free speakerphone.

The ColorTouch Staff Console provides a bright, easy-to read 14.2 cm (5.6 in) color touch screen display that provides at-a-glance visible indication of incoming calls, queued messages, and status indications. The ColorTouch Staff Console display provides an active call display showing location with priority and text message; individual call waiting messages showing the next call's location and priority; and the ability to scroll through the call queue.

The ColorTouch Staff Console provides a telephone dial pad screen for selecting individual stations, telephone dialing, and other numeric functions. The ColorTouch Staff Console's default screen shows all active calls in order of priority. On screen UP/DOWN scroll arrows on the right side of the touchscreen allow the operator to view all calls from subscribed stations. Each call will indicate the room number, call type, and time elapsed since the call was made. Additional touch-screen buttons along the bottom of the display remain in view at all times.

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

[PRODUCT SHEET]

Product:	Smart Patient and Staff/Duty Stations
	HC-PSTN1
	HC-PSTN2
	HC-CCPSTN
	HC-DUTY

SMART PATIENT AND STAFF/ DUTY STATIONS

Features

- **Integrated call cord and pillow speaker connections** One device, many functions
- **NiteLite on-board lighting** Easy visibility under low ambient light conditions
- **Dual patient models available** Economical in semi-private room settings
- **On-board speaker and microphone** Full duplex operation for intercom use
- **Configurable buttons and button labels** Buttons can be individually defined and configured in the field
- **Cleaning mode** Helps to reduce calls when cleaning stations
- **Audible, visible and tactile pushbutton feedback** Each press of a button sounds a tone, produces a response the user can feel, and lights the associated LED
- **Mounts to a standard 3-gang ring on a non-masonry box** Simple to install, clean finished appearance with no visible screws
- **RJ-45 connectivity** Standard plug-in terminations make wiring simple
- **No DIP switches to set** Network addressable for easy setup and installation
- **Each bed call answered individually** Person-to-person communication helps to ensure privacy

Smart Patient and Staff/Duty Stations are a primary point of two-way communications between patients and staff. Equipped with three call buttons and a cancel button, they offer users an easy-to-operate means of placing calls on the patient-staff communications system.

With a built-in speaker and microphone, these devices also provide patients with the means of having a full-duplex channel of audio communications with attending staff, and vice versa. On-board LEDs provide operational feedback as well as status indication.

Smart Patient Stations (HC-PSTN1 & HC-PSTN2) provide separate 18-pin receptacles for the connection of pillow speakers. Each Smart Patient Station also comes equipped with two 0.64 mm (0.25 in) receptacles that can be programmed to accept either an input from auxiliary equipment, or a bed call cord.

Single Smart Patient Stations (HC-PSTN1) provide one set of connections. Dual Smart Patient Stations (HC-PSTN2) provide two sets of connections. Smart Staff/Duty Stations (HC-DUTY) have no bed connections or call cord jacks.

Call Cord Patient Stations (HC-CCPSTN) come equipped with two 0.64 mm (0.25 inch) receptacles that can be programmed to accept either an input from auxiliary equipment or a bed call cord(s). Can be configured to support one or two patient beds.

All stations provide a NiteLite on-board lighting feature for easy visibility under low ambient light conditions. They feature a snap-together design with no mounting screws visible after installation. Their clean, modern look complements any decor.

Smart Patient and Staff/Duty Stations are installed in unobstructed areas next to patient beds. Single Smart Patient Stations serve the needs of one patient. Dual Smart Patient Stations are installed between two beds and have two sets of connectors, one for each bed. Smart Staff/Duty Stations are installed in break rooms and other areas where staff may be reached. They do not have bed connections.

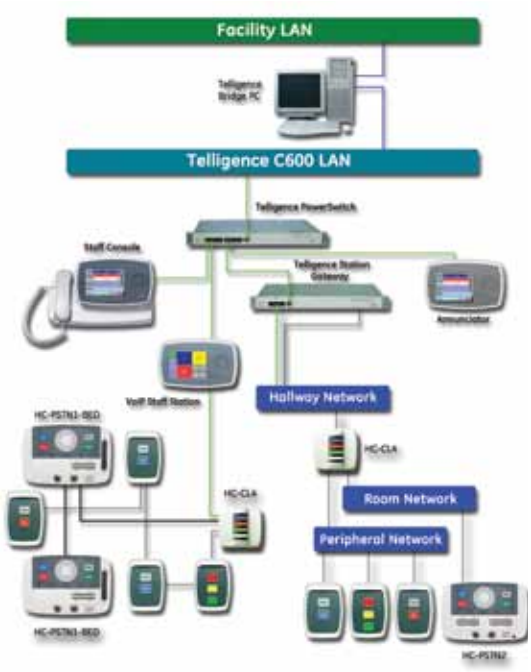
Calls placed on Smart Patient and Staff/Duty Stations register and annunciate at ColorTouch VoIP Staff Consoles and ColorTouch VoIP Annunciators. Connected Infinity LED dome/zone lights will also operate appropriately depending on the nature and urgency of the call. These stations also provide full-duplex audio communications that allow users to speak with Staff Consoles and Annunciators.

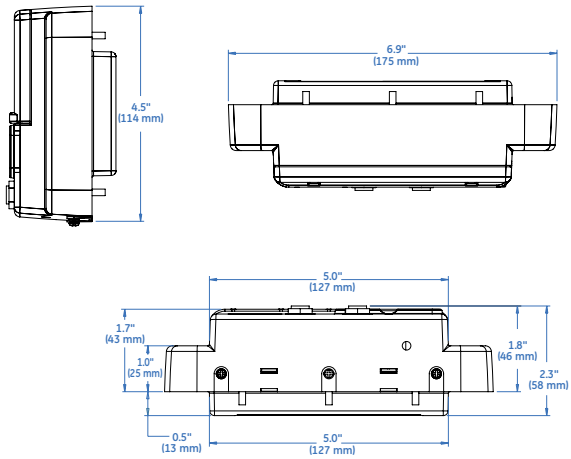
TECHNICAL SPECIFICATIONS

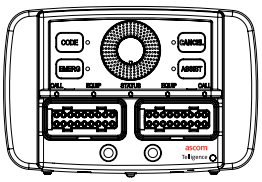
Installation

Smart Patient and Staff/Duty Stations connect to the Telligence LAN/WAN through the Telligence Station Gateway, which provides all necessary power to the device. Stations are connected to the gateway via their associated dome light. Snap-in RJ-45 connections terminate at the station and the dome light. Stations are network addressable and there are no DIP switches or jumpers to set. They mount to standard 3-gang backboxes.

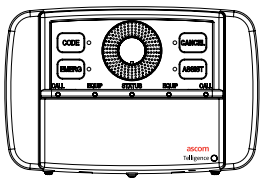
Power specifications	
Electrical rating	
Single Smart Patient Station	40 VDC, 1.9 W
Smart Staff/Duty Station	40 VDC, 1.9 W
Dual Smart Patient Station	40 VDC, 2.2 W
Power source	Telligence Station Gateway
Physical specifications	
Dimensions (H x W x D)	11.4 x 17.5 x 5.8 cm (4.5 x 6.9 x 2.3 in)
Mounting	Wall mounting, 3 gang ring on a non-masonary box.
Construction	Cycoloy®
Flammability rating	94 V-0
Terminations	RJ-45, plus lever-type connectors for TV/Lighting control options
Indicators	LEDs for CODE, EMERG, CANCEL, ASSIST
IP address requirements	None
Audio input	Microphone
Audio output	Speaker for full-duplex intercom
Controls	Buttons for CODE, EMERG, CANCEL and ASSIST
Certifications	
UL, CSA (22.2 No. 205-M1983)	



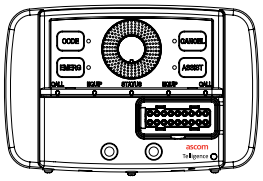




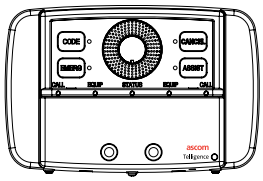
Dual Smart Patient Stations (HC-PSTN2) provide two sets of connections.



Smart Staff/Duty Stations (HC-DUTY) have no bed connections or call cord jacks.



Single Smart Patient Stations (HC-PSTN1) provide one set of connections.



Call Cord Smart Patient Stations (HC-CCPSTN) provide two 0.64 mm (0.25 in) connectors.

Ordering information

Smart Patient and Staff Duty Stations		
Model #	Description	Shipping weight
HC-PSTN1	Single Smart Patient Station	0.41 kg (0.90 lb)
HC-PSTN2	Dual Smart Patient Station	0.41 kg (0.90 lb)
HC-CCPSTN	Call Cord Smart Patient Station	0.41 kg (0.90 lb)
HC-DUTY	Smart Staff/Duty Station	0.41 kg (0.90 lb)
HC-AP-W-4G/3G	Adaptor plate, white 4-gang to 3-gang	0.23 kg (0.50 lb)
HC-AP-W-6G/3G	Adaptor plate, white 6-gang to 3-gang	0.23 kg (0.50 lb)

PERFORMANCE SPECIFICATIONS

Provide Smart Patient and Staff/Duty Stations at the locations specified. The Smart Patient and Staff/Duty Stations install on a 3-gang plaster ring and use a snap-together design with no visible mounting screws after the unit has been installed. All terminations on the Smart Patient and Staff/Duty Stations are on RJ-45 connectors. All addressing of the Smart Patient and Staff/Duty Stations is automatic using an intelligent addressing scheme and does not require any manual addressing using DIP switches at the station location. The Smart Patient and Staff/Duty Stations have a NiteLite feature for visibility in dark rooms. The Smart Patient and Staff/Duty Station buttons are software-configurable and have field-replaceable button labels using a label insert behind the clear button membrane.

Each Smart Patient and Staff/Duty Station is molded from Cycoloy.® A central Telligence Station Gateway supplies all power for the Smart Patient and Staff/Duty Stations.

Three of the buttons on the Patient or Staff/Duty Station may be configured in the field for different functions depending on the need. Customizable labels simply slide behind the switch membrane. Switch functions are set on the Telligence network with software programming tools.

Users operate the station by pressing one of the buttons on the front of the unit. Calls may also be placed by operating a connected call cord or pillow speaker.

Typical station functions include:

CODE: This button initiates a code blue call that activates the corridor light and is displayed on the Staff Console or Annunciator. The system can be configured to automatically page a predetermined staff when this button is pressed

EMERG: When this button is pressed a staff emergency call goes out to the staff console or annunciator and activates the corridor light accordingly.

ASSIST: This button initiates a normal priority call that is displayed on the staff console or annunciator and the corridor light is activated accordingly.

CANCEL: This button clears all active calls registered at the station.

LEDs adjacent to each button on the Patient or Staff/Duty Station indicate the type of call that is placed. Additional LEDs indicate the status of auxiliary hardware and, for dual patient stations, provide visual cues concerning which bed the call originated from. All stations feature NiteLite technology for easy visibility under low ambient light conditions.

Smart Patient and Staff/Duty Stations feature an ingenious cleaning mode that helps to prevent false calls on the system. When the station is idle, pressing the CANCEL button for between two and four seconds temporarily disables the front panel buttons. This allows maintenance personnel to clean the unit without fear of accidentally placing a call.

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

[PRODUCT SHEET]

Product: Pillow Speakers and Call Cords

Innovative nurse call features for healthcare facilities

PILLOW SPEAKERS AND CALL CORDS INNOVATIVE NURSE CALL FEATURES FOR HEALTHCARE FACILITIES

Features

- Standard 0.25 inch call cord connectors compatible for use with Telligence and ProCare patient-staff communication systems
- Large easy-to-operate buttons leave nothing to chance
- DuraPin pillow speaker connectors stay in place, won't pull free with normal use
- Large variety of devices for a wide range of applications
- Optional call cord cable lengths suitable for most bed configurations
- Smooth shape allows for quick and easy cleaning
- High impact polymer construction for long service life and reliable operation

Ascom Telligence call cords and pillow speakers are sturdy, resilient momentary contact devices used to initiate calls from patient stations. These devices are compatible with Telligence, ProCare™ 2000, and ProCare 6000 Nurse Call Communication Systems.

Call cords come standard with an 8-foot long cord (2.4 m), and typically plug into the Patient Station with a 0.25 inch connector. Simple pushbutton operation places a call on the system.

Pillow speakers provide patient-staff communications functions, as well as television control and room lighting control. Models are available that connect to the Patient Station with a DuraPin connection. Other models provide a 37-pin DSUB connector for use with Hill-Rom® and Stryker® electronic beds. These connectors plug into Telligence Smart Patient Stations with BedConnect.

Pillow speakers are available for RCA,® Zenith,® Philips,® or TeleHealth® equipment. Some pillow speakers are available with a Direct Access option, which provides a numeric keypad to input a specific channel. Channel selection on models without Direct Access is made by pressing the up/down channel buttons.

Call cords feature two types of actuators: standard and air. Standard actuators provide a simple contact closure at the call cord head by means of metal contacts. Air-operated actuators use air pressure to close the contacts. This keeps electrical connections away from the patient, making these devices suitable for oxygen-rich atmospheres. These may be used by patients for whom contact with electricity can present a danger or who don't have the physical dexterity to actuate a standard call cord button.

[PRODUCT SHEET: PILLOW SPEAKERS AND CALL CORDS]

Both air-operated and standard call cords are available in a variety of styles and with a range of cable lengths. They plug into Patient Stations or Call Cord Stations with 0.25 inch jacks.

Ordering information

Air actuated cords	
Model #	**Description**
200-1071	Air Cord Assembly, 6 ft (1.8 m) flexible tube, molded right angle plug, 3.25 inch (8.2 cm) pad air actuator.
200-1072	Air Cord Assembly, 8 ft (2.4 m) flexible tube, molded right angle plug, 1.125 inch (2.9 cm) rubber pushbutton air actuator.
200-1073	Air Cord Assembly, 10 ft (3.0 m) flexible tube, molded right angle plug, 3.25 inch (8.2 cm) pad air actuator.
200-446	Air Cord Assembly, 6 ft (1.8 m) flexible tube with security clamp, molded right angle plug, disc shaped pad actuator.
200-447	Air Cord Assembly, 10 ft (3.0 m) flexible tube with security clamp, molded right angle plug, disc shaped pad actuator.
200-448	Air Cord Assembly, Two 6 ft (1.8 m) flexible tubes with security clamps, single molded right angle plug, disc shaped pad actuators.
200-449	Air Cord Assembly, Two 10 ft (3.0 m) flexible tubes with security clamps, single molded right angle plug, disc shaped pad actuators.
Pushbutton cords	
Model #	**Description**
HC-SCC-8Q	Call Cord Assembly, 8 ft wire cord with security clamp, 0.25 inch molded right angle plug, non-locking sealed pushbutton actuator.
200-1173	Call Cord Assembly, Two 6 ft (1.8 m) wire cords with security clamp, single molded right angle plug, non-locking pushbutton actuators.
200-1174	Call Cord Assembly, Two 12 ft (3.7 m) wire cords with security clamp, single molded right angle plug, non-locking pushbutton actuators.
HC-SCC-8	Call Cord Assembly, 8 ft wire cord with security clamp, 18-pin molded right angle connector, non-locking sealed pushbutton actuator. Integrated Call assurance LED.
Pillow speakers, DuraPin connector	
Model #	**Description**
HC-PSPKR-D-A2	Digital Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart' TV Control, Analog Volume Control, 10' cord
HC-PSPKR-D-D2	Digital Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart'TV Control, Digital Volume Control, 10' cord
HC-PSPKR-DA-A2	Direct Access Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart' TV Control, Analog Vol. Control, 10' cord
HC-PSPKR-DA-D2	Direct Access Pillow Speaker w/DuraPin Conn – Nurse Call, Room Light, 'Smart' TV Control, Digital Volume Control, 10' cord
Pillow speakers, 37-pin connector	
Model #	**Description**
7A2131	Smart Pillow Speaker w/37-pin connector, Room Light, RCA TV Control
7B2131	Smart Pillow Speaker w/37-pin connector, Room Light, Zenith TV Control
7C2131	Smart Pillow Speaker w/37-pin connector, Room Light, Philips TV Control

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

[PRODUCT SHEET]

Product: Peripheral Stations
HC-PB Series
HC-PP Series

PERIPHERAL STATIONS

Features

- Site-configurable buttons
- Field programmable
- Supports Signature Series® 2-wire communications protocol
- Anti-microbial pull cord material
- NiteLite on-board lighting
- Pushbutton or pull cord configurable
- Snap-together design – quick installation, no visible screws
- Mounts to a standard single-gang plaster ring mounted on a 10.2 cm (4 in) backbox
- LED indicators
- Fully supervised
- Toggle On/Off buttons

Note: The Telligence system should not be used in lieu of an NFPA compliant fire alarm system.

Peripheral Stations are available in two types, push/pull stations and pushbutton stations. These Peripheral Stations are addressable initiating devices that provide call-for-assistance indication. When a Peripheral Station is activated, visual indication of the call displays at an associated dome light and an appropriate call indication registers on the staff console, as well as on any installed annunciators.

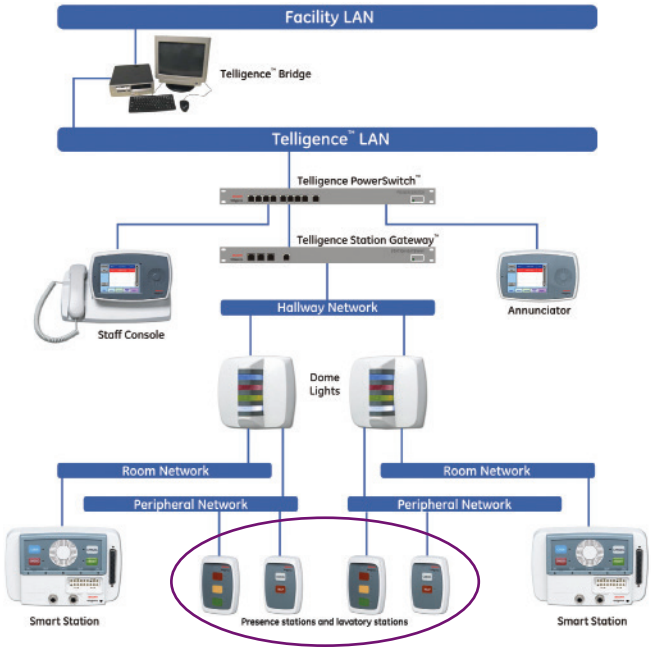
Models come with field-configurable buttons used for placing patient calls, requesting staff assistance, indicating staff presence, or signaling a code blue situation. There are also models that include a relay for activating an elapsed timer or similar device, or a supplemental input for a room smoke detector. All models come with a dedicated button for canceling calls.

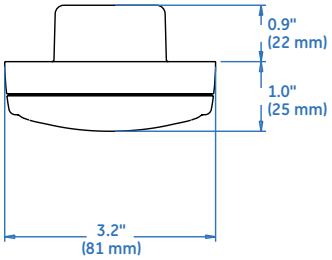
Thanks to their innovative slide-behind membranes, Peripheral Station buttons are easily labeled in the field. This helps make setup and installation of these devices a simple task.

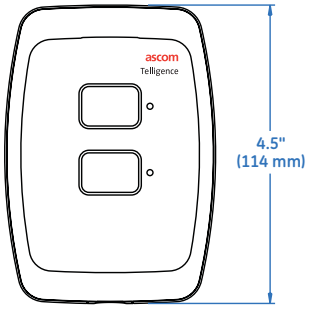
In addition to pushbutton operation, Peripheral Stations may also be fitted with optional non-contaminant polyvinyl pull cords, which can be used to to activate calls.

Peripheral Stations are configurable for "Toggle On / Toggle Off" buttons allowing bed management, patient flow, work flow and other non-clinical type events.

All stations provide a NiteLite™ on-board lighting feature for easy visibility under low ambient light conditions. They feature a snap-together design with no mounting screws visible after installation.







PERFORMANCE SPECIFICATIONS

The Peripheral Stations install on a single-gang ring on a 10.2 cm (4 in) wide non-masonary box and use a snap-together design with no visible mounting screws after it has been installed. The Peripheral Station communicates to the patient-staff communications system using a single pair of circulating wires to connect all patient room peripheral devices to the Dome Light. The Peripheral Station has quick connect terminations for the wires. All addressing of the Peripheral Station is automatic using an intelligent addressing scheme and does not require any manual addressing using DIP switches. The Peripheral Station has a NiteLite feature for visibility in dark rooms. The Peripheral Station has software configurable buttons and field replaceable button legends using a label inserted behind the clear button membrane.

TECHNICAL SPECIFICATIONS

Installation

Peripheral Stations receive all data and power from a single pair of wires originating from the Telligence Station Gateway and routed through an adjacent Infinity™ LED Dome/Zone Light. A single data pair of wires may serve all the Periperal Stations in a patient area.

Stations mount to a standard single-gang ring on a 10.2 cm (4in) wide non-masonry box. Wiring is terminated at a quick-connect terminal block.

The peripheral pull cord station may be installed in wet areas by using the water resistant gasket. Using this gasket will not make the station water-proof. The station must be mounted in a location so that it will not be in constant contact with water spray or splashing. It is recommended to install the station at the same height or higher than the highest mounted shower head, and ideally on the wall opposite the shower head.

Peripheral Stations are installed wherever patients or staff may require assistance, or where it is desirable to activate calls in the patient-staff communications system. These stations support unlimited button types.

Typical configurable button types include:

- **CODE** (code blue)
- **EMERG** (emergency)
- **HELP** (lavatory/shower)
- **STAFF** (staff assist)
- **CALL** (remote call)
- **CANCEL** (remote cancel)
- **CODE** (code pink)
- **FAMILY** (housekeeping)
- **URGENT**

Each pushbutton has a dedicated LED indicator.

Because they are Signature Series devices, these stations are completely self-addressable and there are no DIP switches or jumpers to set. The communications system automatically recognizes and maps each device.

Power specifications	
Electrical rating	19 VDC, .12 W
Physical specifications	
Dimensions (H x W x D)	11.4 x 8.1 x 4.7 cm (4.5 x 3.2 x 1.9 in)
IP address requirements	None
Construction and finish	GE Cycoloy finished with a light texture to reduce fingerprints
Mounting	Single-gang ring on a 10.2 cm (4 in) wide non-masonary box
Flammability rating	94 V-0
Terminations	Quick terminal strip
Indicators	LEDs, one per button and one for back/front lighting
Controls	Field configurable membrane buttons
Certifications	
UL, CSA (22.2 No. 205-M1983)	

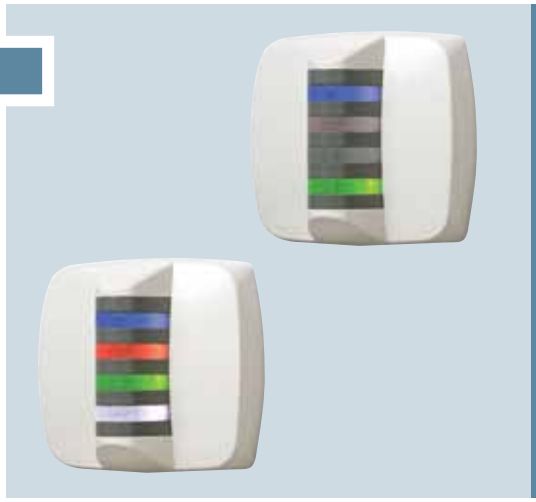
Ordering information

Peripheral stations		
Model #	Description	Shipping weight
HC-PP3-PRES	3-Button Push/Pull Station-Presence	0.12 kg (0.25 lb)
HC-PB2-CALLIN	2-Button Station-Staff Normal Call w/Smoke Input	0.12 kg (0.25 lb)
HC-PB3-CANCEL	3-Button Station-Remote Cancel	0.12 kg (0.25 lb)
HC-PB2-CODE	2-Button Station-Code Blue	0.12 kg (0.25 lb)
HC-PB2-EMERG	2-Button Station-Staff Emergency	0.12 kg (0.25 lb)
HC-PP2-LAV	2-Button Push/Pull Station-Lavatory	0.12 kg (0.25 lb)
HC-PB2-CALLR	2-Button Call Station – With Relay	0.12 kg (0.25 lb)
HC-WPGSKT-1G	Water resistant gasket kit for peripheral station	0.12 kg (0.25 lb)
HC-RPLMT-CLCD-R	Red replacement Call Cord Kit for Peripheral Stations (includes mounting plate)	0.23 kg (0.50 lb)
HC-RPLMT-CLCD-W	White replacement Call Cord Kit for Peripheral Stations (includes mounting plate)	0.23 kg (0.50 lb)
HC-AP-W-2G/1G	Adaptor plate, white 2-gang to 1-gang	0.23 kg (0.50 lb)
HC-AP-W-3G/1G	Adaptor plate, white 3-gang to 1-gang	0.23 kg (0.50 lb)
HC-AP-W-4G/1G	Adaptor plate, white 4-gang to 1-gang	0.23 kg (0.50 lb)
HC-AP-W-3G/2X1G	Adaptor plate, white 3-gang to two 1-gang openings	0.23 kg (0.50 lb)
HC-AP-W-6G/3X1G	Adaptor plate, white 6-gang to three 1-gang openings	0.23 kg (0.50 lb)

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence

PRODUCT SHEET

Product: Infinity Dome and Zone Lights
HC-CLx-Series



INFINITY DOME AND ZONE LIGHTS

Features

- Long-lasting LED technology
- Software-controlled lamp colors
- Junction point for simple room and hall cabling
- Flexible installation options
- Durable housing
- Continually communicates over the Telligence network to report status

Infinity Series LED dome lights provide bright, easy-to-see visual annunciation that help to speed response time and enhance caregiver communication. These devices are typically installed in corridors and outside patient rooms to provide staff with a visual cue as to the origin of a call placed on the system.

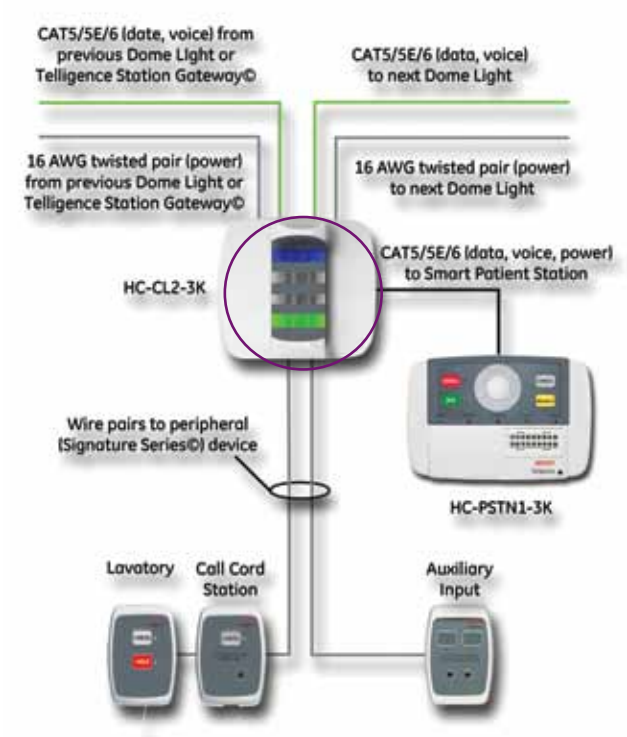
Infinity series LED dome lights operate in a similar fashion to Annunciator panels or Staff Consoles: the light color and flash rate indicate the type and priority of the call. Models are available with one, two or four light sections.

Thanks to advanced LED technology, the HC-CL4, HC-CL4-SUPV and HC-CL2 are software-configurable to illuminate nine colors: blue, red, green, white, amber, yellow, magenta, cyan and pink. The HC-CL2-3K dome lights are software-configurable to illuminate five colors: white, red, blue, green and amber. This innovative capability means that one model can serve many different purposes.

Dome lights provide a visual cue to responders, indicating the part of the building where the call originated. Infinity series LED dome lights can function as either zone or corridor lights. Zone lights are mounted at entrance to hallways; corridor lights are mounted outside each patient's room.

PERFORMANCE SPECIFICATIONS

Corridor lamps have up to four sections with color configurable LEDs in each section. Dome lights utilize multicolor LEDs with a minimum of 15 lumens per section. Each lamp is molded from Cycoloy.® The translucent diffuser on the dome light is visible from 180 degrees. The dome lights operate on low voltage and mount to a standard 1-gang or 2-gang electrical box. Dome lights serve as a junction point for all patient room wiring and corridor wiring.



TECHNICAL SPECIFICATIONS

Installation

The Infinity Series LED dome (corridor) light connects directly to the applicable room or corridor Telligence Station Gateway by means of a snap-in RJ-45 termination. It then becomes the junction point for all the connections made in the associated area. The station gateway provides power to the Infinity Series LED dome (corridor) light, as well as to other peripheral devices.

Infinity Series LED dome (corridor) lights are mounted to standard 1-gang or 2-gang (recommended) electrical boxes. They may be oriented for wall or ceiling installation. LED lamps do not require replacement and are not field serviceable.

Power specifications	
Electrical rating	HC-CL1-RED: 40 VDC, .84 W
	HC-CL2: 40 VDC, 1.2 W
	HC-CL4: 40 VDC, 2.0 W
	HC-CL4-SUPV: 40 VDC, 2.2 W
	HC-CL2-3K: 40 VDC, 1.2 W
Physical specifications	
Dimensions (H x W x D)	11.9 x 12.7 x 7 cm (4.7 x 5 x 2.75 in)
Shipping weight	0.35 kg (0.78 l
Mounting	1-gang or 2-gang (recommended) back box
Construction	Cycoloy®
Flammability rating	94 V-0
Terminations	RJ-45 and lever type connector
Indicators	LEDs capable of seven different colors
Compatibility	Telligence patient-staff communications networks
Certifications	
UL, CSA (22.2 No. 205-M1983)	

Ordering information

Infinity Dome and Zone Lights		
Model #	**Description**	**Shipping weight**
HC-CL1-RED	LED Dome/Zone Light, 1 Section	0.35 kg (0.78 lb)
HC-CL2	Infinity LED Dome/Zone Light, 2 Sections	0.35 kg (0.78 lb)
HC-CL4	Infinity LED Dome/Zone Light, 4 Sections	0.35 kg (0.78 lb)
HC-CL4-SUPV	LED Dome/Zone Light, 1 Section	0.35 kg (0.78 lb)
HC-CL2-3K	Infinity LED Dome/Zone Light, 2 Sections, Telligence C300	0.35 kg (0.78 lb)

Ascom Patient Systems (US)
9024 Town Center Parkway #100
Lakewood Ranch, Florida 34202
Toll Free: 800 385 2639
www.ascom.us/ascom-telligence